

## END SEMESTER EXAMINATIONS, JULY, 2018

## B.TECH. I SEMESTER

COURSE CODE: BCS113 (New Syllabus)  
PROGRAMMING-I

COURSE TITLE: FUNDAMENTALS OF COMPUTER

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- What is function prototype?
- What is the difference between array and structure?
- What would be the output of the following program:

```
#define PRODUCT(x) ( x * x )
```

```
void main( )
```

```
{
```

```
    int i = 3, j;
```

```
    j = PRODUCT( i + 1 );
```

```
    printf ( "\n%d", j );
```

```
}
```

- How many **#include** directives can be there in a given program file?
- What would be the output of the following program:

```
void main( )
```

```
{
```

```
    int b[ ] = { 0, 20, 0, 40, 5 };
```

```
    int i, *k;
```

```
    k = b;
```

```
    for ( i = 0 ; i <= 4 ; i++ )
```

```
    {
```

```
        printf ( "\n%d" *k );
```

```
        k++;
```

```
    }
```

```
}
```

- Differentiate between while and do-while loop. Also write their syntax.
- How does append mode differ from write mode in a file?
- What would be the output of the following program:

```
void main()
```

```
{
```

```
    func() ;
```

```
    func() ;
```

```
}
```

```
func( )
```

```
{
```

```
    auto int i = 0 ;
```

```
    register int j = 0 ;
```

```
    static int k = 0 ;
```

```
    i++ ; j++ ; k++ ;
```

```
    printf ( "\n %d %d %d", i, j, k );
```

```
}
```

- i. List the modes along with their purpose in which a file can be opened.
- j. What is the difference between recursion and iteration? Give suitable example.

### Section (B)

**Q. 2.** Attempt **any 5** questions.

(7 x 5 = 35)

- a. Write an algorithm to reverse the digits of an integer number. Also draw the flow chart for the same.
- b. What is the purpose of having storage classes in C? Explain with suitable example along with their life, default initial value, scope and storage.
- c. Write a C function to swap two numbers using call-by-reference parameter passing method.
- d. What is string? List the different types of string-handling functions along with their syntax and return value, if any.
- e. Write a C program to find the Fibonacci series upto  $n^{\text{th}}$  term using recursion.
- f. How many types of logical operators are there in 'C' programming language? Give the differences between macros and functions.
- g. Define a macro. Write a nested macro that gives the minimum of three values.

### Section (C)

Attempt **any 3** questions.

(15 x 3 = 45)

- Q. 3.**
  - a. Write a program to find the sum and average of the given numbers using the do-while loop. (7.5)
  - b. Write a C program to count the number of characters, spaces, tabs and newlines in a file. (7.5)
- Q. 4.**
  - a. Write a C program to multiply two matrices. (7.5)
  - b. Write a C program to determine whether a given number is an Armstrong number or not. (7.5)
- Q. 5.**
  - a. Explain the use of default in switch block with the help of an example. (7.5)
  - b. Differentiate between array and structure. Write a C program to create a book structure having name, author, page and price. (7.5)
- Q. 6.**
  - a. Differentiate between pointer (\*) and address (&) operator using examples. (7.5)
  - b. Define a function and explain why function prototype is essential. Under which situations you will prefer to use interpreter over compiler. (7.5)
- Q. 7.**
  - a. Explain the following operators with the help of examples (7.5)
    - (i) Conditional operator    (ii) sizeof operator    (iii) Increment operator
  - b. Write down the rules for naming a variable. How are values initialized in one dimensional array? Should the entire array be initialised in the definition? (7.5)

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## END SEMESTER EXAMINATION, JANUARY-2018

## PROGRAM : B.TECH. FIRST SEMESTER

COURSE CODE : BCS113

COURSE TITLE : FUNDAMENTALS OF COMPUTER PROGRAMMING-I

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- What is the difference between getch() and getchar()?
- Differentiate between **continue** and **break** statement.
- What are file inclusion directives?
- How does append mode differ from write mode in a file?
- "Array elements are stored at continuous memory locations". Justify this statement.
- What will be the output of the following program:

```
void main()
{
    int a[5]={5,1,15,20,25};
    int i,j,k=1,m;
    i=++a[1];
    j=a[1]++;
    m=a[i++];
    printf("\n%d %d %d", i,j,m);
}
```

- State whether the address of a register variable is accessible or not. Justify your statement.
- Differentiate between structure and union with suitable example.
- What is the difference between recursion and iteration? Give suitable example.
- Define array and give two examples where the concept of array is used.

Section (B)

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- Write an algorithm to generate Fibonacci series upto nth term. Also draw the flow chart for the same.
- What is the purpose of having storage classes in C? Explain with suitable example along with their life, default initial value, scope and storage.
- What is the difference between pass by value and pass by reference? Write a C program to support your answer.
- What is a nested structure? How to access the members in a nested structure? Write a C program to illustrate this.
- Write a C program to find the factorial of a number using recursion.
- What is a header file? List five header file names. Can we create user defined (our own) header files? If yes then write the steps involved in it.
- What is macro substitution? How can we do it? Explain nesting of macros with suitable example.

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

- Write a C program to find the sum of digits of a number using recursion. (7.5)
  - Write a C program to explain various operations that can be performed on files. (7.5)
- Write a C program to find the sum of integer values stored in an array using pointer. (7.5)
  - Define String. Write down a program to count the number of vowels and digits in a given string. (7.5)

- Q. 5. a. What are preprocessor directives? List any three of them. What is the difference between **#include <filename>** and **#include "filename"**? (7.5)
- b. Differentiate between array and structure. Write a C program to create a book structure having name, author, page and price. (7.5)
- Q. 6. a. Differentiate between pointer (\*) and address (&) operator using examples. (7.5)
- b. What are compilers and interpreters? List the advantages of an interpreter over a compiler. Under which situations you will prefer to use interpreter over compiler. (7.5)
- Q. 7. a. What do you mean by conditional operator? Write a C program to illustrate its use. (7.5)
- b. Write down the rules for naming a variable. Why keywords can not be used as variable names. Is there any keyword in C which can be used as operator? (7.5)

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#### Section (C)

- Q. 3. a. Write a C program to find the sum of digits of a number using recursion. (7.5)
- b. Write a C program to explain various operations that can be performed on files. (7.5)
- Q. 4. a. Write a C program to find the sum of integer values stored in an array using pointer. (7.5)
- b. Define String. Write down a program to count the number of vowels and digits in a given string. (7.5)

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**END SEMESTER EXAMINATIONS, JUNE-2018****PROGRAM : B.TECH. SECOND SEMESTER****COURSE CODE : BCS114(Old Syllabus) COURSE TITLE : FUNDAMENTALS OF COMPUTER PROGRAMMING - I****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections and Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What do you understand by header file? Name any five header files.
- b. What is the syntax of the switch....case statement? Also write the algorithm for the same.
- c. What is the difference between structure and union? Give example.
- d. What is the difference between array and strings? Explain with example.
- e. Draw the flowchart to find the greatest among three numbers.
- f. What is the difference between keyword and identifiers? Explain with example.
- g. What is meant by keywords? Name any 10 keywords in C.
- h. Write the two methods of adding a comment in C.
- i. What do you understand by typecasting? Give example.
- j. State if True or False:
  - i. C is a case sensitive Language
  - ii. String is a keyword

**SECTION B****Q. 2.** Attempt any 5 questions. .**(7 x 5 = 35)**

- a. What do you understand by data types? Explain the different types of data with example.
- b. Write a program using functions to check whether the number is prime or not.
- c. Write a program to check whether the number is Palindrome or not.
- d. Explain the different strings functions given below with the help of example-
  - i. strncat()
  - ii. strchr()
  - iii. strcpy()
  - iv. strspn()
  - v. strcspn()
- e. What are the different types of operators in C. Explain with the help of example.
- f. What is flowchart? Draw a flowchart to check whether a number is Armstrong or not. And also write the code for the same.
- g. Write a program to delete an element in an array.

**SECTION C**

Attempt any 3 questions.

**(15 x 3 = 45)**

- Q. 3.**
- a. Write a program to find the factorial of any number using recursive functions.
  - b. Write the program to perform multiplication on two 2X2 matrices.

**(7.5)****(7.5)**

**Q. 4.** Explain the following with the help of examples:

**(5\*3)**

- i. Dynamic Memory Allocation
- ii. Pointers to pointers
- iii. Searching in an array

**Q. 5.** Differentiate between compile time errors and run time errors? Find the error/errors, if any:

(1+2\*)

|                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                   |
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| <p><b>(a)</b> void main()<br/>         { int button = 10;<br/>         int switch = 20;<br/>         if(button)<br/>         printf("switch");<br/>         else<br/>         printf("button); }</p>                                                                                                                                                                 | <p><b>(b)</b> int main( )<br/>         { const double PI;<br/>         int n;<br/>         PI = 3.14159265358979;<br/>         n = 22;<br/>         }</p>                         |
| <p><b>(c)</b> int array[5],i;<br/>         for(i=0;i&lt;=5;i++)<br/>         { printf("%d",array[i]);<br/>         printf("\n"); }</p>                                                                                                                                                                                                                               | <p><b>(d)</b> void main()<br/>         { int x;<br/>         x=(float)9/2;<br/>         printf("%f",x); }</p>                                                                     |
| <p><b>(e)</b> void main()<br/>         { char s[20]={computer};<br/>         char s2[20]={computing};<br/>         int status=strcmp(s1,s2);<br/>         if(status==0)<br/>         printf("s1 is equal to s2");<br/>         else<br/>         if(status&gt;0)<br/>         printf("s2 is greater");<br/>         else<br/>         printf("s1 is greater"); }</p> | <p><b>(f)</b> void main()<br/>         { int i=1;<br/>         for( ;j&lt;=0; )<br/>         {<br/>         printf("%d",i*5);<br/>         ++j;<br/>         }<br/>         }</p> |
| <p><b>(g)</b> void main()<br/>         { int *p, **ptr;<br/>         int data;<br/>         p=&amp;data;<br/>         p=&amp;ptr;<br/>         *p=100;<br/>         printf("%d",data);<br/>         **ptr=200;<br/>         printf("%d",data);<br/>         data=300;<br/>         printf("%d",data); }</p>                                                          |                                                                                                                                                                                   |

**Q. 6.** What is meant by formatting of input and output? Write the output for the following:

(1+2\*7)

|                                                                                                                                                                                                                |                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>(a)</b> void main()<br/>         { int i, index=0;<br/>         for(i=0;i&lt;10;i++)<br/>         { int i=0;<br/>         while(i++&lt;5)<br/>         index++; }<br/>         printf("%d",index); }</p> | <p><b>(e)</b> int main()<br/>         { int x, y=10, z=10;<br/>         x=(y==z);<br/>         printf("%d",x); }</p>                                                                                                     |
| <p><b>(b)</b> void main()<br/>         { int x=0;<br/>         while(x&lt;=50==0)<br/>         for( ; )<br/>         if(++x%50==0)<br/>         break;<br/>         printf("%d",x);<br/>         }</p>         | <p><b>(f)</b> void main()<br/>         { char c;<br/>         int a;<br/>         a=97;<br/>         printf("%d",a);<br/>         c=a;<br/>         printf("%c",c);<br/>         a=c;<br/>         printf("%d",a); }</p> |

|                                                                                                                                                                               |                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre> (c) int f(int a, int b) { if( a&lt;b)   return(f(b,a));   if(b==0)   return (a);   return(f,(b,a%b)); } void main() { int a =12, b=154;   Printf("%d", f(a,b)); }</pre> | <pre> (g) void main() { int x[10], i, *px=x, *py;   py=&amp;x[5];   i=py-(px++);   px+=3;   printf("%x",px);   //assume address of x[0] is 2000, size of int is   2 bytes.   printf("%d",i); }</pre> |
| <pre> (d) void main() { int i, j, x=0;   for(i=0;i&lt;5;i++)     for(j=i;j&gt;5;j--)       x+=i+j-1;   printf("%d",x); }</pre>                                                |                                                                                                                                                                                                      |

- Q. 7.** a. What do you understand by library and user define functions? Give example. Write a program using functions that convert a binary number into decimal number. **(8)**
- b. Write a program to find the greatest and smallest element in an array using pointers. **(7)**

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**END SEMESTER EXAMINATIONS, JUNE-2018****PROGRAM : B.TECH. SECOND SEMESTER****COURSE CODE : BCS114(New Syllabus) COURSE TITLE : FUNDAMENTALS OF COMPUTER PROGRAMMING - II****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections and Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. Why do we need virtual function
- b. Define abstraction.
- c. What is dynamic memory allocation?
- d. Enlist the operators that cannot be overloaded.
- e. What is scope resolution operator?
- f. Differentiate between abstraction and encapsulation.
- g. Explain file pointers.
- h. What is destructor?
- i. What are vectors and lists.
- j. Explain early binding and late binding.

**SECTION B****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Write down atleast 7 difference between C & C++.
- b. Explain How to pass parameters to base class constructors, with suitable example.
- c. Explain diamond shaped Inheritance by taking a suitable example.
- d. Write a program to swap private data of two classes.
- e. What is operator overloading? Explain different ways of implementing it.
- f. Explain the process of handling an Exception by taking an example of divide by zero exception.
- g. Explain various storage classes.
- h. Write and explain various ios class functions, used for formatted I/O.

**SECTION C**

Attempt any 3 questions.

**(15 x 3 = 45)**

- Q. 3.**
  - a. What are inline functions? Explain with the help of a program. (7.5)
  - b. Differentiate between call by value, call by address and call by reference with example. (7.5)
- Q. 4.**
  - a. What is inheritance? Explain its different forms. (7.5)
  - b. What are public, private and protected derivations of a class. (7.5)
- Q. 5.**
  - a. Explain various ways of opening a file by taking suitable examples. (7.5)
  - b. Discuss the different file stream classes in C++. (7.5)
- Q. 6.**
  - a. List down rules for overloading operators. (7.5)
  - b. W.A.P. to overload ++ operator that will increment each member of an array by 1. (7.5)
- Q. 7.**
  - a. What are templates in C++. Explain class template and function template by writing their syntax. (7.5)
  - b. Explain STL along with all its components. (7.5)

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## END SEMESTER EXAMINATIONS, JUNE-2018

## PROGRAM : B.TECH. SECOND SEMESTER

COURSE CODE : BCS114(Old Syllabus)

COURSE TITLE : FUNDAMENTALS OF COMPUTER PROGRAMMING - II

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections and Questions.

**SECTION A**

(2 x 10 = 20)

Q. 1. Attempt all questions.

- What do you understand by header file? Name any five header files.
- What is the syntax of the switch....case statement? Also write the algorithm for the same.
- What is the difference between structure and union? Give example.
- What is the difference between array and strings? Explain with example.
- Draw the flowchart to find the greatest among three numbers.
- What is the difference between keyword and identifiers? Explain with example.
- What is meant by keywords? Name any 10 keywords in C.
- Write the two methods of adding a comment in C.
- What do you understand by typecasting? Give example.
- State if True or False:
  - C is a case sensitive Language
  - String is a keyword

**SECTION B**

(7 x 5 = 35)

Q. 2. Attempt any 5 questions. .

- What do you understand by data types? Explain the different types of data with example.
- Write a program using functions to check whether the number is prime or not.
- Write a program to check whether the number is Palindrome or not.
- Explain the different strings functions given below with the help of example-
  - strncat()
  - strchr()
  - strcpy()
  - strspn()
  - strcspn()
- What are the different types of operators in C. Explain with the help of example.
- What is flowchart? Draw a flowchart to check whether a number is Armstrong or not. And also write the C code for the same.
- Write a program to delete an element in an array.

**SECTION C**

(15 x 3 = 45)

Attempt any 3 questions.

- Write a program to find the factorial of any number using recursive functions. (7.5)
  - Write the program to perform multiplication on two 2X2 matrices. (7.5)

Q. 4. Explain the following with the help of examples:

(5\*3)

- Dynamic Memory Allocation
- Pointers to pointers
- Searching in an array

**Q. 5.** Differentiate between compile time errors and run time errors? Find the error/errors, if any:

**(1+2\*7)**

|                                                                                                                                                                                                                                                                                       |                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <p><b>(a)</b> void main()<br/> { int button = 10;<br/> int switch = 20;<br/> if(button)<br/> printf("switch");<br/> else<br/> printf("button"); }</p>                                                                                                                                 | <p><b>(b)</b> int main( )<br/> { const double PI;<br/> int n;<br/> PI = 3.14159265358979;<br/> n = 22;<br/> }</p>         |
| <p><b>(c)</b> int array[5],i;<br/> for(i=0;i&lt;=5;i++)<br/> { printf("%d",array[i]);<br/> printf("\n"); }</p>                                                                                                                                                                        | <p><b>(d)</b> void main()<br/> { int x;<br/> x=(float)9/2;<br/> printf("%f",x); }</p>                                     |
| <p><b>(e)</b> void main()<br/> { char s[20]={computer};<br/> char s2[20]={computing};<br/> int status=strcmp(s1,s2);<br/> if(status==0)<br/> printf("s1 is equal to s2");<br/> else<br/> if(status&gt;0)<br/> printf("s2 is greater");<br/> else<br/> printf ("s1 is greater"); }</p> | <p><b>(f)</b> void main()<br/> { int i=1;<br/> for( ;j&lt;=0; )<br/> {<br/> printf("%d",i*5);<br/> ++j;<br/> }<br/> }</p> |
| <p><b>(g)</b> void main()<br/> { int *p, **ptr;<br/> int data;<br/> p=&amp;data;<br/> p=&amp;ptr;<br/> *p=100;<br/> printf("%d",data);<br/> **ptr=200;<br/> printf("%d",data);<br/> data=300;<br/> printf("%d",data); }</p>                                                           |                                                                                                                           |

**Q. 6.** What is meant by formatting of input and output? Write the output for the following:

**(1+2\*7)**

|                                                                                                                                                                |                                                                                                                                                          |
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| <p><b>(a)</b> void main()<br/> { int i, index=0;<br/> for(i=0;i&lt;10;i++)<br/> { int i=0;<br/> while(i++&lt;5)<br/> index++; }<br/> printf("%d",index); }</p> | <p><b>(e)</b> int main()<br/> { int x, y=10,z=10;<br/> x=(y==z);<br/> printf("%d",x); }</p>                                                              |
| <p><b>(b)</b> void main()<br/> { int x=0;<br/> while(x&lt;=50==0)<br/> for(;;)<br/> if(++x%50==0)<br/> break;<br/> printf("%d",x);<br/> }</p>                  | <p><b>(f)</b> void main()<br/> { char c;<br/> int a;<br/> a=97;<br/> printf("%d",a);<br/> c=a;<br/> printf("%c",c);<br/> a=c;<br/> printf("%d",a); }</p> |

|                                                                                                                                                                                                              |                                                                                                                                                                                                                   |
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| <p><b>(c)</b> int f(int a, int b)</p> <pre>{ if( a&lt;b)   return(f(b,a));   if(b==0)   return (a);   return(f,(b,a%b)); }</pre> <p>void main()</p> <pre>{ int a =12, b=154;   Printf("%d", f(a,b)); }</pre> | <p><b>(g)</b> void main()</p> <pre>{ int x[10], i, *px=x, *py;   py=&amp;x[5];   i=py-(px++);   px+=3;   printf("%x",px);   //assume address of x[0] is 2000, size of int is   2 bytes.   printf("%d",i); }</pre> |
| <p><b>(d)</b> void main()</p> <pre>{ int i, j, x=0;   for(i=0;i&lt;5;i++)     for(j=i;j&gt;5;j--)       x+=i+j-1;   printf("%d",x); }</pre>                                                                  |                                                                                                                                                                                                                   |

- Q. 7.** a. What do you understand by library and user define functions? Give example. Write a program using functions that convert a binary number into decimal number. **(8)**
- b. Write a program to find the greatest and smallest element in an array using pointers. **(7)**

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## END SEMESTER EXAMINATIONS, JULY-2018

PROGRAM : B.TECH. / MCA

THIRD SEMESTER

COURSE CODE : CCS203 / MCA202

COURSE TITLE : DATABASE MANAGEMENT SYSTEMS

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

SECTION A

Q. 1. Attempt all questions.

(2 x 10 = 20)

- a. Define data independence.
- b. What is query?
- c. What is NULL value?
- d. Differentiate between DELETE and DROP TABLE command.
- e. What is data replication?
- f. Define function of primary key.
- g. What is division operator?
- h. What do you mean by relation?
- i. Define transaction?
- j. Explain LIKE predicate in SQL.

SECTION B

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- a. What do you mean by three level architecture? Explain with the help of diagram.
- b. What is DBMS and how it is different from conventional flat file systems?
- c. Explain concurrent executions of transactions in DBMS.
- d. Explain GROUP BY and HAVING BY CLAUSE in SQL.
- e. Define Foreign key. What is this concept used for? How does it play a role in the join operation?
- f. Define the concept of aggregation. Give two examples of where this concept is useful.
- g. Construct and explain an E-R diagram for a car-insurance company whose customers own one or more cars each.

SECTION C

Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3. a. How relational algebra is different from SQL? Explain various UNARY RELATIONAL operations. (05)
- b. Consider the following database and solve the following queries using relational algebra. (10)

Suppliers(sid, sname, address)

Parts(pid, pname, color)

Catalog(sid, pid, cost)

- i. Find the names of suppliers who supply some red part.
- ii. Find the supplier names of the suppliers who supply a red part that costs less than 100 dollars.
- iii. Retrieve all details of supplier with id '112'
- iv. Find the total number of parts where cost is greater than 150 dollars.
- v. Retrieve the total cost of supplier with id '112'.

Q. 4. Write the SQL Queries for the following

Sailors(Sailorid; Sailorname; Rating; Age)

Reserves(Sailorid; Boatid; Day)

Boats(Boat-id; Boatname; color)

- a. Design the above schema and consider the keys with the help of design constraints. (05)

b.

- i. Find total number of sailors who have reserved boat 103.
- ii. Retrieve the detail of sailors who reserved all red boats.
- iii. Find the colors of boats reserved by the sailor lubber and Gilson
- iv. Find names and boat id of sailors who reserved red and green boats.
- v. Find name of the youngest sailor who reserved red boats.

- Q. 5. a. List and discuss the six inference rules for functional dependencies. Give relevant examples. (07)  
b. Define normalization? Explain in brief 1 NF, 2 NF and 3 NF with suitable example. (08)

- Q. 6. a. Discuss in detail the operators SELECT, PROJECT and UNION with suitable examples. (07)  
b. How does SQL allow implementation of the entity integrity and referential integrity constraints of the relational data mode? Explain with an example. (08)

- Q. 7. a. What is concurrency in transaction? Explain with the help of example. How it is controlled. (08)  
b. Discuss the ACID properties of transactions in detail. Explain with an example of each. (07)

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## SECTION C

Enrol. No. S R H U

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**END SEMESTER EXAMINATIONS, JULY-2018**  
**PROGRAM : B.TECH. (CSE)                      THIRD SEMESTER**

**COURSE CODE : CCS204****COURSE TITLE : OBJECT ORIENTED PROGRAMMING USING C++****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What is scope resolution operator?
- b. What is the use of this pointer?
- c. What is destructor?
- d. What do you understand by type casting?
- e. Explain chained assignment.
- f. Define extraction operator.
- g. Define early and late binding.
- h. What are exceptions?
- i. List the operators that cannot be overloaded.
- j. Differentiate between abstraction and encapsulation.

**SECTION B****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. With the help of an example explain how the constructors in the derived classes are handled.
- b. Differentiate between public, private and protected derivation with the help of a diagram.
- c. Differentiate between POP and OOP.
- d. What is friend function? Write a program to swap the private data of two classes.
- e. What are inline functions? Explain with the help of a program.
- f. Differentiate between call by value, call by address and call by reference.
- g. State the similarities and differences between structure and a class.

**SECTION C**

Attempt any 3 questions.

**(15 x 3 = 45)**

- Q. 3.**
  - a. What are virtual function? What are the rules for virtual function? **(7.5)**
  - b. Write a program to demonstrate the runtime polymorphism. **(7.5)**
- Q. 4.**
  - a. Discuss the different file stream classes in C++. **(7.5)**
  - b. Write a program that reads a text file and creates another file that is identical except that every sequence of consecutive blank spaces is replaced by a single space. **(7.5)**
- Q. 5.**
  - a. What is inheritance? What are the various forms of inheritance? **(7.5)**
  - b. Write a program to demonstrate hybrid inheritance. **(7.5)**
- Q. 6.**
  - a. What is operator overloading? What do you understand by compile time polymorphism? **(7.5)**
  - b. Write a program to overload the following operators for an array: **(7.5)**
    - i. ++ (to increment all the array elements)
    - ii. \* 2 (to multiply all the array elements with 2)
    - iii. << (to display array elements)
    - iv. >> (to input array elements)
- Q. 7.**
  - a. What are constructors? Why constructor cannot be virtual? **(7.5)**
  - b. Write a program to demonstrate constructor overloading and dynamic constructor with the help of example. **(7.5)**

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**END SEMESTER EXAMINATIONS, JULY-2018**  
**PROGRAM : B.TECH.(CSE)                      THIRD SEMESTER**

**COURSE CODE : CCS206****COURSE TITLE : PRINCIPLES OF PROGRAMMING LANGUAGES****[Time allotted: Two hours]****[Max. Marks: 50]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What do you mean by imperative language?
- b. What is task?
- c. When is a language said to be strongly typed?
- d. What do you mean fetch execute cycle?
- e. Write about enum data type in C.
- f. What is race condition?
- g. Define Reference Variable in C++
- h. What is garbage collection?
- i. What is scheduler?
- j. What is orthogonality?

**SECTION B****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Discuss about the various attributes of good programming language.
- b. What is array and its design issues, also discuss row major and column major with example?
- c. Define task, synchronization, competition and cooperation synchronization and deadlock.
- d. Discuss semaphore and monitor.
- e. Explain Abstraction and Encapsulation with real world examples.
- f. What is pointer? Discuss design issues of pointers with example? How is it different from reference type concept?
- g. Discuss the evaluation criteria of programming languages with example.

**SECTION C**

Attempt any 3 questions.

**(15 x 3 = 45)**

- Q. 3.**
  - a. Explain polymorphism with examples.
  - b. Briefly describe about elementary and composite data types with example.
- Q. 4.**
  - a. Discuss the structure of a compiler with its various stages.
  - b. Explain event handling with example.
- Q. 5.**
  - a. Elaborate on Storage Management.
  - b. Define subprograms. How are they defined and invoked?
- Q. 6.**
  - a. What do you mean by exception handling? How can an exception handler be written in Java so that it handles any exception?
  - b. Discuss procedural and object oriented with its advantages and disadvantages.
- Q. 7.**
  - a. Explain Logic Programming with its basic types and applications.
  - b. Define BNF Grammar. How parse tree is generated from grammar? Explain with example.

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Enrol. No. S R H U

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**END SEMESTER EXAMINATION, JANUARY-2018**  
**PROGRAM : B.TECH.(CSE) THIRD SEMESTER**

**COURSE CODE : CCS206****COURSE TITLE : PRINCIPLES OF PROGRAMMING LANGUAGES****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt **all** questions.**(2 x 10 = 20)**

- a. Define operator precedence and operator associativity.
- b. Discuss about type-checking.
- c. What is race condition?
- d. What are the primary tasks of a lexical analyzer?
- e. Define syntax and semantics.
- f. What is fetch execute cycle?
- g. Write BNF notation for if-else statements
- h. What is an alias?
- i. What is a state transition diagram?
- j. Some programming languages are typeless. What are the obvious advantages and disadvantages of having no types in a language?

**Section (B)****Q. 2.** Attempt **any 5** questions.**(7 x 5 = 35)**

- a. What are recognizers & Generators?
- b. What is symbolic logic? Why and how it is used?
- c. Explain various states of task and draw its transition diagram.
- d. What are the general characteristics of subprograms?
- e. What is Garbage collection. Discuss about 3 of its techniques.
- f. Explain different types of parameter passing techniques.
- g. What is a semaphore? Why and How it is used?

**Section (C)**Attempt **any 3** questions.**(15 x 3 = 45)**

- Q. 3.**
  - a. Explain the characteristics that influences Language evaluation Criteria. (7.5)
  - b. What is a variable and what are the attributes of a variable? Elaborate on address of a variable. (7.5)
- Q. 4.**
  - a. Discuss the design issues of Exception Handling. (7.5)
  - b. What is an event. Explain how it is similar and dissimilar to Exception handling? (7.5)
- Q. 5.**
  - a. Explain various types of binding. (7.5)
  - b. What is an overloaded subprogram? Explain by taking an example. (7.5)
- Q. 6.**
  - a. Mention various design issues of OOP. (7.5)
  - b. Explain in detail about the pillars of an object-oriented programming language? (7.5)
- Q. 7.**
  - a. Explain various levels of concurrency. (7.5)
  - b. What is synchronization. Discuss about its various types. (7.5)

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**END SEMESTER EXAMINATION, JANUARY-2018****PROGRAM : B.TECH.(ME/ECE/CSE/CE/EE)****THIRD SEMESTER****COURSE CODE : HSC210****COURSE TITLE : INDUSTRIAL SOCIOLOGY****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt all questions.**(2 x 10 = 20)****a. Fill in the blanks:**

- i. 'Industrial Dispute Act' consist of ..... sections including ..... Chapters.
- ii. In ..... 'The New Economic Policy' was adopted by India.
- iii. .... is the First National Trade Union Organization in India.
- iv. Departmental representative takes .....(time) for grievance settlement

**b. Answer the following:**

- i. Who is the author of the book 'Das Capital'?
- ii. Who coined the term Industrial Revolution?

**c. Find True or False:**

- i. In Open Door Policy, the rate of conspiracy is more than step ladder policy.
- ii. Industrial Informal Relation is based on status and hierarchy.
- iii. Socio-psychological approach of trade unionism was given by Tannenbaum.
- iv. AITUF was responsible for the affiliation of trade unionism in India.

**d. Match the following:**

- | <u>A</u>                    | <u>B</u>                             |
|-----------------------------|--------------------------------------|
| i. Division of labor        | Emile Durkheim                       |
| ii. Adjudication            | Karl Marx                            |
| iii. Class & class conflict | legal remedy of dispute              |
| iv. Sympathetic strike      | emergency period<br>Secondary strike |

- e. Distinguish between uplift and business trade unions.
- f. Write down the full forms of AITUC, INTUC, HMS and UTUC.
- g. What is collective bargaining?
- h. What is lock-out?
- i. In which year 'The Maternity Benefit Act' was enacted?
- j. What do you mean by Concurrent list of Indian Constitution?

**Section (B)****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Discuss the nature of industrial sociology.
- b. Meaning and Characteristic of Industrial Revolution.
- c. Explain the functions of Trade unionism.
- d. Discuss anti-capitalist approach of Trade Unionism.
- e. Discuss various types of strikes.
- f. Write down the name and full forms of the 12 Central Trade Union organization presently functioning in India.
- g. Critically analyze 'Industrial Employment Act' giving special reference to Standing Orders.

**Section (C)**

Attempt any 3 questions.

**(15 x 3 = 45)**

- Q.3.** a. Define Industrial Dispute. Write down the causes of industrial dispute. **(7.5)**
- b. Explain Industrial Dispute Resolution Mechanism. **(7.5)**

- Q.4.** a. Explain different types of relations found in industry. (7.5)  
b. Discuss 'The Industrial Dispute Act' in detail. (7.5)
- Q. 5.** a. Define Trade Union. Discuss the development of trade unionism in India. (7.5)  
b. Explain the types of trade unions with examples. (7.5)
- Q. 6.** a. Give a comparative analysis of factory system and domestic system of production. (7.5)  
b. Explain the grievance settlement procedure. (7.5)
- Q. 7.** a. Critically analyze the labor laws in India. (7.5)  
b. Discuss the problems arise due to Industrialization in India. (7.5)

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#### Section (B)

(7 x 5 = 35)

- Q. 1.** Attempt any 5 questions.
- Discuss the nature of industrial sociology.
  - Meaning and Characteristics of Industrial Revolution.
  - Explain the functions of Trade Unionism.
  - Discuss anti-capitalist approach of Trade Unionism.
  - Discuss various types of strikes.
  - Write down the name and full form of the 13 Central Trade Union organization presently functioning in India.
  - Critically analyze Industrial Employment Act giving special reference to Standing Orders.

#### Section (C)

(12 x 5 = 60)

- Q. 2.** Attempt any 3 questions.
- Define Industrial Dispute. Write down the causes of industrial dispute.
  - Explain Industrial Dispute Resolution Mechanism.

Enrol. No. S R H U

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**END SEMESTER EXAMINATIONS, JUNE - 2018**  
**PROGRAM : B.TECH. (CSE)      FOURTH SEMESTER**

**COURSE CODE : CCS209****COURSE TITLE : DATA STRUCTURES/ DATA STRUCTURES &  
FILE ORGANIZATION****[Time allotted: Three hours]****[Max. Marks : 100]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What is data structure?
- b. What is hashing
- c. Define DEQUEUE.
- d. What are the applications of Stack?
- e. Define the term List.
- f. Differentiate between array and linked list.
- g. What is the worst case complexity of bubble sort?
- h. What are the major operations of the data structure?
- i. Write down the pseudo code for multiplication of two dimensional arrays.
- j. Write down the pseudo code of full() in Queue.

**SECTION B****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Write down the algorithm to insert an element 'e' in an array 'A'. An array follows the following properties:
  - i. The elements inserted at the last
  - ii. The last inserted element deleted first.
- b. Each element of an array Data[20][50] requires 4 bytes of storage. Base address of Data is 2000. Determine the location of Data[10][10] when array is stored as (assume lower bound=0):
  - i. Row Major    ii. Column Major
- c. Write down the algorithm of the evaluation of the postfix expression. Evaluate 5,6,2,+,\*,12,4,/,- by using Stack.
- d. Write down the insertion sorting program. Find out the average case complexity of insertion sort.
- e. Write down the pseudo code or programme to implement linked by using array data structure.
- f. Consider the following queue of characters, implemented as array of six memory locations:-  
Front = 2, Rear = 3  
Queue : \_\_, A, D, \_\_, \_\_, \_\_  
Where ' \_\_ ' denotes empty cell. Describe the queue as the following operations take place
  - i. Add 'S'
  - ii. Add 'J'
  - iii. Delete two letters
  - iv. Shift towards left to bring all free spaces to the right side
  - v. Insert M,H,I and delete a letter.
- g. Write down the pseudo code to reverse the single linked list.

### SECTION C

Attempt **any 3** questions.

(15 x 3 = 45)

- Q. 3.** a. Write down the programme for the merge sort and find out the complexity of the programme in all the cases. (7.5)
- b. Write down the algorithm for transforming infix expressions into postfix expressions and convert the following expression into postfix expression by using Stack. (7.5)
- i. X and Y OR NOT (A>B)
- Q. 4.** a. Create a Binary tree from Preorder and Inorder traversals. (7.5)
- Preorder F A E K C D H G B  
Inorder E A C K F H D B G
- b. Write down the pseudo code for deleting an element from the BST. (7.5)
- Q. 5.** a. write a program to sort the a list of elements stored in a linked list using bubble sort. (7.5)
- b. Suppose characters **a,b,c,d,e,f** have probability **.07, .09, .12, .22, .23, .27** respectively. Find an optimum Huffman Code and draw the Huffman tree. What is the average code length? (7.5)
- Q. 6.** a. Write algorithm for searching item in unsorted circular linked list (7.5)
- b. Write a program in C to reverse a string using stack. (7.5)
- Q. 7.** Implement a Queue with the help of doubly linked list (15)

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**END SEMESTER EXAMINATIONS, JUNE-2018**  
**PROGRAM : B.TECH.(CSE)    FOURTH SEMESTER**

**COURSE CODE : CCS211****COURSE TITLE : UNIX AND SHELL PROGRAMMING****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections and Questions.

**SECTION A**

**Q. 1.** Attempt **all** questions.**(2 x 10 = 20)**

- a. List features of UNIX operating system.
- b. Write a note on environment variables.
- c. What is system call?
- d. Write a note on command line argument.
- e. Write a note on Quoting and Escaping.
- f. Define internal and external commands.
- g. Explain pattern searching in command line.
- h. Define term kernel in context of UNIX.
- i. List down essential administrative task.
- j. Write a note on exit status of commands.

**SECTION B**

**Q. 2.** Attempt **any 5** questions.**(7 x 5 = 35)**

- a. Explain process, process priority and related commands.
- b. What do you understand by positioning parameters? State an example.
- c. Explain about disk utility commands.
- d. Write down a script to find greatest number by getting minimum 3 numbers as user input from standard input device.
- e. Explain method of processing data in text file.
- f. Discuss the following commands in short taking an example -  
wc, more, cp, comm, diff
- g. Write down process scheduling commands with syntax.

**SECTION C**

Attempt **any 3** questions.**(15 x 3 = 45)**

- Q. 3.**
  - a. Explain vi modes and switching between them with general navigation commands.
  - b. Explain UNIX file organization, what is the importance of inode. Explain with reference to symbolic link and hard link.
- Q. 4.**
  - a. How we can change file permissions and explain Symbolic and Absolute permissions.
  - b. Explain ls command and its multi column output with command options.
- Q. 5.**
  - a. Explain process in UNIX. Draw a process state diagram and list process related commands.
  - b. Explain test command and write down shell script for carry out string and numerical test.
- Q. 6.**
  - a. The length & breadth of a rectangle and radius of circle are input through the keyboard. Write a shell script to calculate the area & perimeter of the rectangle, and the area & circumference of the circle.
  - b. Write down history of UNIX operating system compare security features with other and explain open source software.
- Q. 7.**
  - a. Explain regular expression and discuss following filters with command line syntax:
    - i. pr
    - ii. head
    - iii. grep
    - iv. sed
    - v. awk
  - b. Write down syntax for control instruction and loop statement in shell script with suitable example.

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**END SEMESTER EXAMINATION, JUNE - 2018**  
**PROGRAM : B.TECH. (CSE)                      FOURTH SEMESTER**

**COURSE CODE : CCS207****COURSE TITLE : COMPUTER ORGANIZATION AND ARCHITECTURE****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

**SECTION A**

**Q.1.** Attempt **all** questions.**(2 x 10 = 20)**

- a. Write the truth table of J-K flip flop.
- b. Define Mapping?
- c. Give the formula for Speed up?
- d. Name all hardware interrupts.
- e. What is Page Fault?
- f. Define space time diagram.
- g. What is non vectored interrupt?
- h. What is full for of CPI?
- i. What is the role of Program Counter?
- j. Explain the belady's anomaly?

**SECTION B**

**Q.2.** Attempt **any 5** questions.**(7 x 5 = 35)**

- a. Give the truth table of all the flip flops.
- b. Define multiplexer and de-multiplexer with the help of diagram.
- c. What is memory mapping technique? Define direct mapping and associative memory techniques.
- d. Define all the interrupts of 8085 microprocessor.
- e. What is memory hierarchy? Explain with the help of diagram.
- f. Consider 42 bit physical address, where the size of cache memory is 4MB and the size of cache block is 128B. Compute the number of tag bits if 8-way set associate mapping is used.
- g. Consider a hypothetical processor which support with 2 address, 1 address and o address. It supports 128 word memories. An 18 bit instruction is place one memory cell. If there exists 2, 2 address instruction and 250, 1 address instruction. How many 0 address instruction is formulated.

**SECTION C**

Attempt **any 3** questions.**(15 x 3 = 45)**

- Q.3.**
  - a. What is virtual memory? Explain the various volatile memories in detail.
  - b. What is DMA? Explain with the help of diagram.
- Q.4.**
  - a. What do you mean by addressing modes? Explain various addressing modes with the help of examples.
  - b. Consider a cache with .7 hit ratio for read and .8 hit for write operation. If there is any miss (read or write) a 3 word block should be moved from memory to cache. Let there are 200 out of 1000 references are for write operation and access time for cache memory and main memory is 10ns and 100 ns respectively with write through updations. Find out the following:
    - i. Avg write access time
    - ii. Avg read and write access time

- Q.5.** Consider the following 4-stage instruction pipeline where different instruction are spending different amount of time at different stage. How many clock cycles are required to complete them? Also find out the efficiency over the non pipelined system?

|    | S1 | S2 | S3 | S4 |
|----|----|----|----|----|
| I1 | 2  | 1  | 2  | 2  |
| I2 | 1  | 3  | 3  | 1  |
| I3 | 2  | 2  | 2  | 2  |
| I4 | 1  | 2  | 1  | 2  |

- Q.6.**
- What is memory organization? Explain with the help of diagram and also discuss about the various types of memory organization.
  - A nonpipeline system takes 80 ns to process a task. The same tasks can be processed in a 11 stages pipeline with the clock cycle of 10 ns. Determine the speedup ratio of pipeline for the 100 task.
- Q.7.**
- Define the followings.
    - FIFO page replacement
    - Multilevel Cache
    - Time Multiplexed Pins
    - Register addressing Modes
  - Consider the following page reference string:  
4,5,7,1,2,4,5,1,3,4,5,7  
Identify the hit ratio using FIFO and OPR using 3 frames.

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**END SEMESTER EXAMINATIONS, JUNE - 2018**  
**PROGRAM : B.TECH.(CSE)      FOURTH SEMESTER**

**COURSE CODE : CCS208****COURSE TITLE : PROGRAMMING IN JAVA****[Time allotted: Three hours]****[Max. Marks : 100]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What is a meaning of "final" keyword associated with variable, method and class?
- b. Differentiate between == and equals method?
- c. What is the thin client?
- d. Java says "write once, run anywhere". Comment?
- e. Does garbage collection guarantee that a program will not run out of memory?
- f. Given the following class definition which of the following can be legally placed after the comment line

//Here ? , justify your answer

```

class Base{
    public Base(int i){}
}

public class MyOver extends Base {
    public static void main(String arg[]) {
        MyOver m = new MyOver(10);
    }
    MyOver(int i){
        super(i);
    }
    MyOver(String s, int i){
        this(i);
        //Here
    }
}

```

- i. MyOver m = new MyOver();
  - ii. super();
  - iii. this("Hello",10);
  - iv. Base b = new Base(10);
- g. Given the following code, which statements can be placed at the indicated position without causing compilation errors?

```

public class ThisUsage {
    int planets;
    static int suns;
    public void gaze() {
        int i;
        // ... insert statements here ...
    }
}

```

Select all valid answers:

- (a) i = this.planets;
  - (b) i = this.suns;
  - (c) this = new ThisUsage();
  - (d) this.i = 4;
  - (e) this.suns = planets;
- h. Why "byte code" is required in JAVA? Can you reverse-engineer the code from byte code?
- i. Is "shake your brain" a primitive value? Define it.
- j. What will happen when you attempt to compile and run this program?

```

public class Outer {
    public String name = "Outer";
    public static void main(String argv[]) {
        Inner i = new Inner();
        i.showName();
    } //End of main

    private class Inner {
        String name = new String("Inner");
        void showName() {
            System.out.println(name);
        }
    } //End of Inner class
}

```

### SECTION B

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- What is JAVA API? Develop an Interest interface which contains simpleInterest and compInterest methods and static final field of Rate 25%. Write a class to implement those methods.
- Are constructors inherited? Can a subclass call the parent's class constructor? When and how?
- What is Synchronization? Write a program for mutual exclusive.
- Explain polymorphism in detail, and write a program to implement it.
- Write an applet that contains three buttons OK, CANCEL and HELP and one textfield. If OK is pressed shown on the status bar-"OK is pressed" and the textfield should turn red. When CANCEL is pressed - shown on the status bar-"CANCEL is pressed" and text field should turn green. When HELP is pressed shown on the status bar-"HELP is pressed" and the text field should turn yellow.
- Discuss connectivity with jdbc and mysql, also write a program to show all the records of the employee table where the department is cis.
- What is adapter classes, source and listener?

### SECTION C

Attempt any 3 questions.

(15 x 3 = 45)

- What does the keyword "synchronize" mean in java? When do you use it? What are the disadvantages of synchronization? Write a program to achieve synchronization in JAVA?
  - Define wrapper classes. Write a program to print reverse of a given no?
- Describe the usage of ByteStream classes with examples. Also write a program to display the content of a file on monitor as well as copy it to the other file.
  - Define try-catch, finally, throws, throw with example?
- What is web development, write a program to implement a html, servlet and jsp page.
- How to declare, initialize and define array in JAVA?
  - Write a program to input n numbers using arrays and then print the sum of them, try to access an array variable which is outside the array index and then handle the "ArrayIndexOutOfBoundsException" exception. If user enter the value of n as 0, then show how JAVA can also create zero element array and handle the "DivisionByZero" exception.
- Define Border Layout Manager and also write advantage do Java's layout managers provide over traditional windowing systems.
  - What is networking in java? Write a program to implement it.

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**END SEMESTER EXAMINATIONS, JUNE-2018**  
**PROGRAM: B.TECH.(CSE)      FOURTH SEMESTER**

**COURSE CODE : CCS212****COURSE TITLE : SOFTWARE ENGINEERING****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

**SECTION A**

**Q. 1.** Attempt **all** questions.**(2 x 10 = 20)**

- a. What are the characteristics of the software?
- b. State possible problems with spiral model.
- c. What are the functional and non-functional requirements?
- d. What are the different levels of CMM?
- e. Write a note on software quality assurance.
- f. Explain RUP model and its activities.
- g. Differentiate white box and black box testing.
- h. Define coupling and its various types.
- i. What is software failure? How it is related with fault?
- j. Write a short note on E-R diagram.

**SECTION B**

**Q. 2.** Attempt **any 5** questions.**(7 x 5 = 35)**

- a. Define software engineering and need of software engineering.
- b. What is requirement engineering? Explain requirement elicitation process.
- c. Explain different phases of SDLC. Explain input and output of each phase.
- d. Explain different types of maintenance.
- e. Define cost estimation techniques in detail.
- f. Explain object oriented and function oriented design approach.
- g. Explain use case modeling with example.

**SECTION C**

Attempt **any 3** questions.**(15 x 3 = 45)**

- Q. 3.**
  - a. Explain V-Model and differentiate with waterfall model with neat diagram.
  - b. Draw the context diagram and level-1 DFD for library management system. Draw USE-CASE diagram for this.
- Q. 4.**
  - a. Explain the economics of maintenance. Justify that maintenance cost is more than other phases of SDLC.
  - b. Explain prototyping model and RAD model for software life cycle and various activities in each phase.
- Q. 5.**
  - a. Define the meaning of software quality and detail the factors which affect the quality not productivity of a software product.
  - b. Differentiate Data flow Diagram and E-R diagram. Assume an appropriate system and design DFD and E-R diagram. Justify your answer.
- Q. 6.**
  - a. Discuss SRS and the general IEEE format of a SRS document and discuss its main components in detail.
  - b. Assume that the size of an organization type an organic type software product has been estimated to be 32000 lines of source code. Assume that the average salary of software engineer be Rs. 15000/month. Determine the effort required to develop the software product and the nominal development time.
- Q. 7.**
  - a. Identify the aim of the structured analysis activity. Which documents are produced at the end of structured analysis and structure design activity?
  - b. Identify different types of views of a system captured by UML diagrams. Represent the following relations among classes using UML diagram:
    - i. Students credit 5 courses each semester. Each course is taught by one or more teachers.
    - ii. Bill contains number of items. Each item describes some commodity, the price of unit, and total on this price.

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## END SEMESTER EXAMINATIONS, JUNE - 2018

## PROGRAM: B.TECH. (CSE)

## FOURTH SEMESTER

COURSE CODE : AMA202

COURSE TITLE : DISCRETE MATHEMATICAL STRUCTURES

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

## SECTION A

Q.1. Attempt all questions.

(2 x 10 = 20)

a. If  $A = \{a, b, c, d\}$  and  $B = \{a, c, e, f, g\}$ . Then find  $A \oplus B$ .b. Let  $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$  then find  $A \vee B$ .

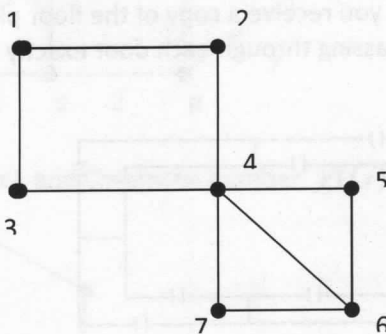
c. Write the contrapositive of implication: If today is Monday, then tomorrow is Tuesday.

d. Let  $R = \{(t, u), (u, w), (u, x), (u, v), (v, z), (v, y)\}$  be a relation defined on a set  $A = \{t, u, v, w, x, y, z\}$  Determine if  $R$  is a tree, if it is, find the root.

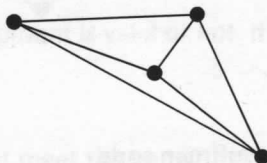
e. If 9 colors are used to paint 100 houses. Find at least how many houses will be of same colors.

f. Let  $A = \{1, 2, 3\}$ , and the matrix of relation  $R$  on  $A$  be given as  $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$ . Then find the matrix of relation  $R^{-1}$ .g. If  $A = \{1, 2, 3, 4, 5\}$  and  $R = \{(1, 1), (1, 2), (2, 3), (3, 5), (3, 4), (4, 5)\}$  is a relation on  $A$ , then find  $R^2$ .

h. Determine whether the following graph has a Hamiltonian circuit, a Hamiltonian path but no Hamiltonian circuit, or neither. Give reasons for your answer



i. Find the chromatic number of the given graph :

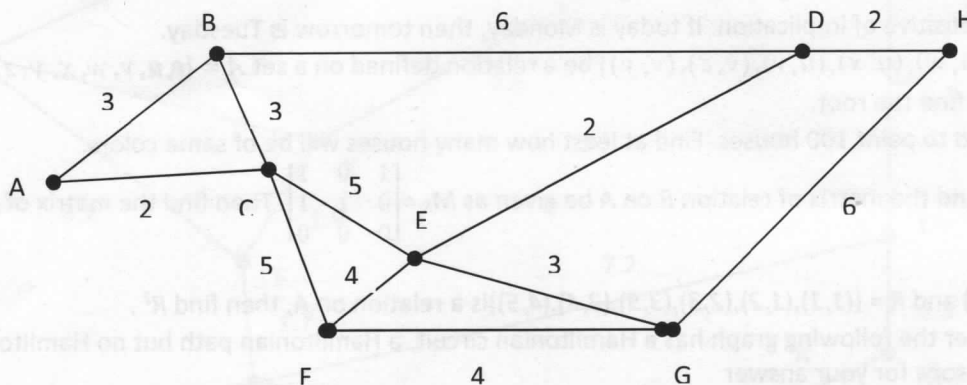
j. In the poset  $(\mathbb{Z}^+, |)$ , are integers 5 and 7 comparable? Give reason in support of your answer.

## SECTION B

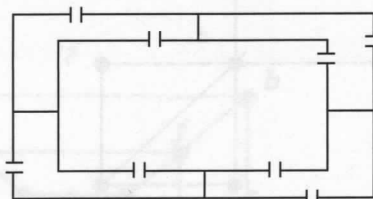
**Q. 2.** Attempt **any 5** questions.

**(7 x 5 = 35)**

- a. In a survey of 120 people, it was found that: 65 read Newsweek magazine, 45 read Time and 42 read Fortune. 20 read both Newsweek and Time, 25 read both Newsweek and Fortune, 15 read both Time and Fortune and 8 read all three magazines.
  - i. Find the number of people who read at least one of the three magazines,
  - ii. Fill in the correct number of people in every regions of the Venn diagram,
  - iii. Find the number of people who read exactly one magazine.
- b. Prove that, for every positive integer  $n$ , the expression  $2^{n+2} + 3^{2n+1}$  is divisible by 7.
- c. Let  $A = \{1, 2, 4, 8\}$  and let  $\leq$  be the partial order of divisibility on  $A$ . Let  $A' = \{0, 1, 2, 3\}$  and  $\leq'$  be the usual relation "less than equal to" on integers. Show that  $(A, \leq)$  and  $(A', \leq')$  are isomorphic posets.
- d. Use Kruskal's algorithm to calculate the minimum spanning tree of the following graph :



- e. At the door of an historical mansion, you receive a copy of the floor plan for the house given below. Is it possible to visit every room in the house by passing through each door exactly once. If so, give sketch of your tour. Explain your reasoning properly.



- f. Suppose that an urn contains 15 balls, of which eight are red and seven are black. In how many ways can five balls be chosen so that -
  - i. all five are red,
  - ii. three are red and two are black,
  - iii. at most three are black.
- g. Construct the labeled tree that represents the Huffman code  
 A000 S001 C01 D1100 E1101, and use it -
  - i. To find the string corresponding to the word CAES, ESAR
  - ii. To decode the messages 1100011101, 1101000001

### SECTION C

Attempt any 3 questions.

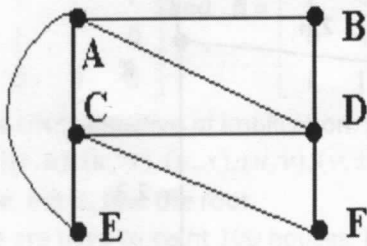
(15 x 3 = 45)

**Q. 3. (a)** Let  $A = \{a_1, a_2, a_3, a_4, a_5\}$  and  $R$  be a relation on set  $A$  defined as

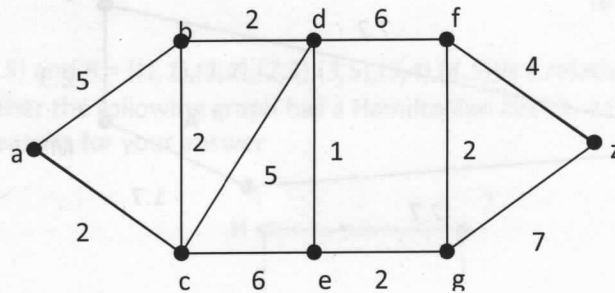
$R = \{(a_1, a_1), (a_1, a_2), (a_1, a_4), (a_2, a_3), (a_3, a_3), (a_3, a_5), (a_4, a_4), (a_5, a_2)\}$ . Compute the transitive closure of  $R$  using Warshall's algorithm. (8)

**(b)** Let  $A = \mathbb{R} \times \mathbb{R}$  ( $\mathbb{R}$  is the set of reals). Define the relation  $S$  on  $A$  as  $(a, b) S (c, d)$  if and only if  $a^2 + b^2 = c^2 + d^2$ . Check whether  $S$  is an equivalence relation on  $A$ . (7)

**Q. 4. (a)** Apply Fleury's algorithm, beginning with vertex  $F$ , to find an Eulerian Circuit in the following graph. (7)



**(b)** Find the shortest path between the vertices  $a$  and  $z$  in the following graph by applying Dijkstra's algorithm. (8)



**Q. 5. (a)** Define Chromatic polynomial  $P_G(x)$  and Chromatic number  $\chi(G)$  then determine  $P_G(x)$  and  $\chi(G)$  for the following graph. (10)



**(b)** State whether the following argument is valid or not. If it is valid, identify the tautology or tautologies on which it is based. (5)

If my plumbing plans do not meet the construction code, then I cannot build my house.

If I hire a licensed contractor, then my plumbing plans will meet the construction code.

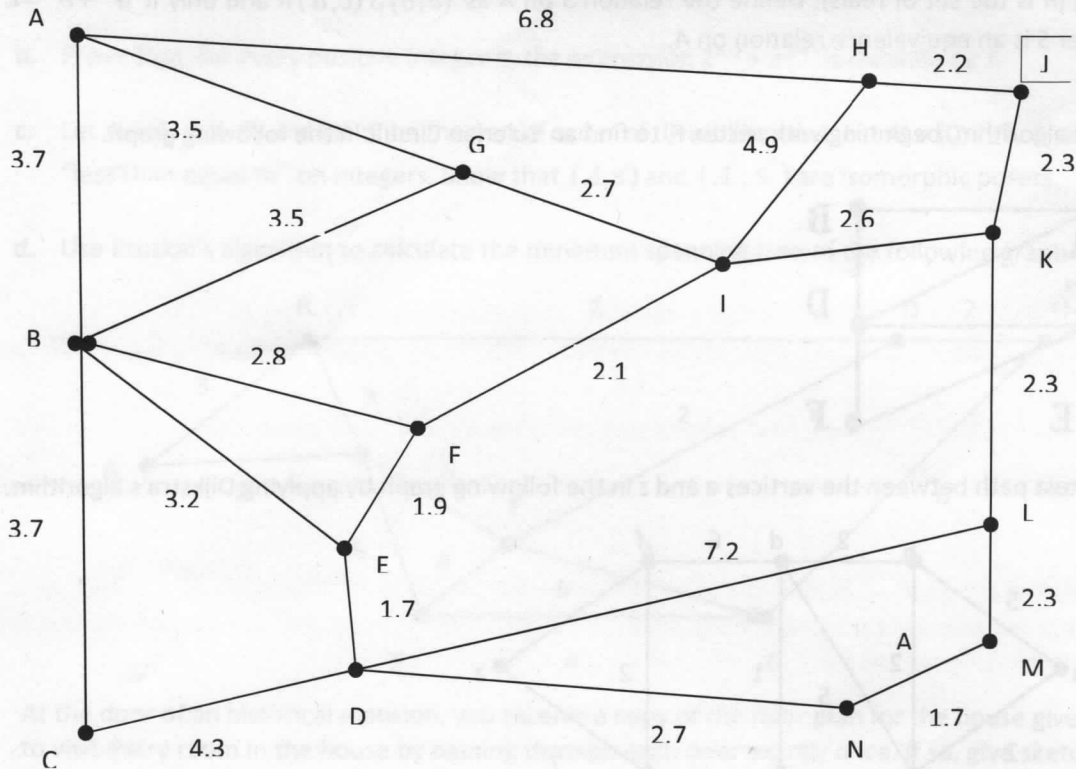
I hire a licensed contractor.

$\therefore$  I can build my house

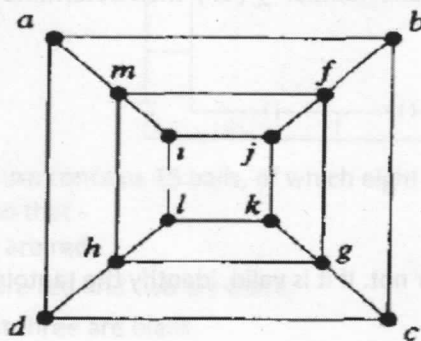
**Q. 6. (a)** Let  $n$  be a positive integer and  $D_n$  be a set of all positive divisors of  $n$ . Check whether  $D_{20}$  is a lattice, give proper reasoning in support of your answer. (7)

**(b)** Solve the recurrence relation  $a_n = -2a_{n-1} + 2a_{n-2} + 4a_{n-3}$ ; with initial conditions  $a_1 = 0, a_2 = 2, a_3 = 8$ . (8)

**Q. 7. (a)** What is a minimum spanning tree. Apply Prim's algorithm to calculate the minimum spanning tree of the following graph by starting at vertex K. (10)



**(b)** Let  $G$  be the graph given below : (5)



and Let  $R$  be the equivalence relation on the set of vertices  $V$ , defined as

$R = \{(i,i), (i,j), (i,k), (j,k), (j,l), (k,l), (k,i), (k,j), (k,k), (f,c), (b,f), (b,b), (b,c), (c,l), (l,i), (l,j), (l,k), (l,l),$

$(a,a), (a,m), (d,d), (g,g), (m,a), (m,m), (i,l), (j,j), (j,i), (f,f), (f,b), (c,f), (c,b), (c,c), (h,h)\}$ .

Draw the quotient graph  $G^R$ .

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**END SEMESTER EXAMINATIONS, JANUARY-2018**  
**PROGRAM: B.TECH.(CSE) FIFTH SEMESTER**

**COURSE CODE : CCS304****COURSE TITLE : DESIGN AND ANALYSIS OF ALGORITHMS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.

**Section (A)**

**Q. 1.** Attempt **all** questions.**(2 x 10 = 20)**

- a. Define best-case, average-case, & worst-case of an algorithm.
- b. Differentiate between time complexity and space complexity.
- c. What is the running time of quicksort when all elements of array A have the same value?
- d. What is the relationship between P, NP, NP-complete & NP-hard problems?
- e. Differentiate between O,  $\Theta$ , &  $\Omega$  asymptotic notations.
- f. What is minimum spanning tree?
- g. Give the applications of spanning tree.
- h. Prove that if  $f(n) = O(n^2)$  then  $[f(n)]^2 \in O(n^2)$ .
- i. What is Optimization Problem?
- j. Explain the process of binary search.

**Section (B)**

**Q. 2.** Attempt **any 5** questions.**(7 x 5 = 35)**

- a. What is back substitution method of solving a recursive time equation? Explain with the help of example.
- b. What is Master's theorem. List down all its cases.
- c. Write an algorithm to Sum all the diagonal elements of a matrix. Deduce its time complexity.
- d. Solve 4-Queens problem using backtracking.
- e. Sort the following using the heap sort algorithm.  
35, 45, 25, 11, 6, 85, 17, 35
- f. Explain why and how verification algorithm is used by using suitable example?
- g. Given a recurrence  $T(n) = 2T(n/2) + n^2$ . Obtain the asymptotic bound using recursion tree method.

**Section (C)**

Attempt **any 3** questions.**(15 x 3 = 45)****Q.3.** a. What is optimal merge patterns? Explain with example.**(7.5)**

b. What is the optimal Huffman code for the following set of frequencies based on first 8 Fibonacci number?

a:1   b:1   c:2   d:3   e:5   f:8   g:13   f:21. **(7.5)****Q.4.** a. Sort the following list using quick sort: 10, 5, 13, 4, 15, 11, 6, and 12.**(7.5)**

b. Write algorithm for merge process in merge sort. Deduce its time complexity

**(7.5)****Q.5.** a. Write and explain an algorithm which is used to solve single source shortest path problem. How is it different from all pair shortest path algorithms?**(7.5)**b. Find optimal solution for a 0/1 knapsack instance-  $(w_1, w_2, w_3, w_4) = (10, 15, 6, 9)$ ,  $(p_1, p_2, p_3, p_4) = (2, 5, 8, 1)$  and capacity  $(m) = 30$ , using branch- and-bound technique.**(7.5)**

**Q.6.** Consider the following undirected graph-

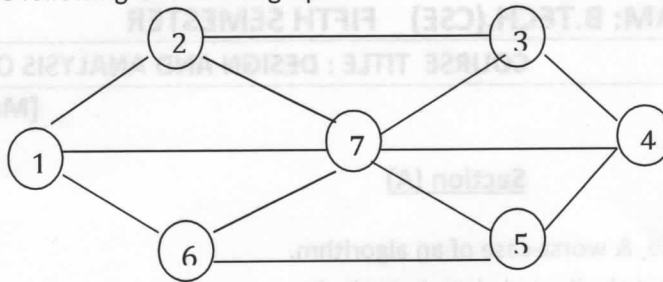


Figure 1: undirected graph

- Find the adjacency list representation of the graph.
- Find a depth-first spanning tree starting at node 1.
- Find a breadth-first spanning tree starting at node 1.

**Q.7.** a. By taking a suitable example, explain the process of inorder, preorder & post order.

- Explain Hamiltonian circuit problem and vertex cover problem.

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## END SEMESTER EXAMINATIONS, JANUARY-2018

PROGRAM : B.TECH.(CSE) FIFTH SEMESTER

COURSE CODE : CCS302

COURSE TITLE : COMPUTER GRAPHICS

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- a. What are the basic hardware and software used in computer Graphics?
- b. Brief on the governing equation of ellipse and circle with their symmetry properties.
- c. Explain aspect ratio and resolution in term of graphics.
- d. Write short note on homogeneous coordinate.
- e. What do you mean by scan conversion?
- f. Write short note on refresh rate and frame buffer?
- g. What is the meant by phong shading?
- h. List down different line style.
- i. Prove that reflection is equal to rotation by 180 degree.
- j. Short note on different types of light source.

Section (B)

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- a. Explain Random and Raster Scan display methods.
- b. Given a circle radius  $r=10$ , demonstrate the midpoint circle algorithm by determining positions along the circle octant in the first quadrant from  $x=0$  to  $x=y$ .
- c. Explain normalized view volume with viewing pipeline.
- d. Write short notes on reflection and shear transformation in 2D graphics.
- e. Write a note on parallel and perspective projection with respective diagram.
- f. List out merits and demerits of DVST and differentiate with CRT.
- g. Explain shadow mask method with neat diagram.

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

- Q. 3.
  - a. Explain flat panel display, with neat sketch and working principle.
  - b. Explain Cohen Sutherland line clipping algorithm with suitable example.
- Q. 4.
  - a. What is an illumination model? Develop an illumination model to consider ambient light, specular reflection and diffused reflection.
  - b. Draw lines from (20,10) to (30,18) using Bresenham's algorithm. Compare this with the DDA algorithm.
- Q. 5.
  - a. Explain Weiler Atherton algorithm for polygon clipping. How it is different from Sutherland-Hageman algorithm.
  - b. Explain working principle of depth buffer method for back surface detection.
- Q. 6.
  - a. With suitable example and appropriate mathematical models, explain various projections.
  - b. Explain fixed point transformation for 2D objects.
- Q. 7.
  - a. Explain scan line algorithm and polygon coloring methods and their algorithms?
  - b. Perform a 45 degree rotation of given geometry A(0,0), B(1,1), C(5,2)
    - i. About the origin
    - ii. About P(-1,-1)

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## END SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : ~~MCA FIFTH SEMESTER~~ B.TECH.V SEMESTER(CSE)

COURSE CODE : MCA304/ CCS305

COURSE TITLE : WEB TECHNOLOGY

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

Section (A)Q. 1. Attempt **all** questions.

(2 x 10 = 20)

- a. AJAX stands for?
- b. ASP stands for?
- c. What is Ruby on Rails?
- d. MVC stands for?
- e. node.js is a?
- f. JSON stands for?
- g. DOM stands for?
- h. <li> is used for?
- i. <a href="url"> is used for?
- j. <th> is used for?

Section (B)Q. 2. Attempt **any 5** questions.

(7 x 5 = 35)

- a. Explain information passing using GET method.
- b. What is Document Object Model?
- c. What is Bootstrap? Explain in detail.
- d. What is jQuery? Explain why it is important?
- e. Explain all ways to insert CSS.
- f. Explain 5xx series of server errors.
- g. Explain 3xx series of redirection.

Section (C)Attempt **any 3** questions.

(15 x 3 = 45)

Q. 3. a. What is Geolp locator? Explain its working.

(7.5)

b. What is a plug-in and widget in CMS?

(7.5)

Q. 4. a. What is Angular JS? Explain why it is used?

(7.5)

b. What is SEO? Explain On-page and Off-page SEO.

(7.5)

Q. 5. a. Explain SEM in detail.

(7.5)

b. Explain the use and importance of CGI.pm.

(7.5)

Q. 6. a. Explain MVC model for Ruby on Rails

(7.5)

b. What is Active record in Ruby on Rails?

(7.5)

Q. 7. a. What is a controller in MVC model?

(7.5)

b. What is a URL and domain of any web site? Why it is important? Explain in detail.

(7.5)

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## END SEMESTER EXAMINATION, JANUARY-2018

## PROGRAM : B.TECH.(CSE) FIFTH SEMESTER

COURSE CODE : CCS307

COURSE TITLE : THEORY OF COMPUTATION

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

Section (A)

Q. 1. Attempt all questions.

(2 x 10 = 20)

- What is application of Myhill-Narode Theorem?
- Construct a TM as transducer of 2's Complement.
- Define PDA with one example.
- Given the language  $L = \{ab, aa, baa\}$ , which of the following strings are in  $L^*$ ?
  - abaabaaaabaa
  - aaaabbbaaa
- Why we add null to initial state in arden's theorem?
- What is NP-Hard and NP-Complete?
- When we say a problem is decidable? Give an example of Undecidable Problem?
- Define Halting Problem.
- Reduce the grammar:  
 $S \rightarrow 0A \mid 1B \mid C$   
 $A \rightarrow 0S \mid 00$   
 $B \rightarrow 1 \mid A$   
 $C \rightarrow 01$
- Which one is more powerful, DFA or NDFA? Justify your answer.

Section (B)

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- Given a grammar  $G$  with production rules  
 $S \rightarrow aB \mid bA$ ,  $A \rightarrow aS \mid bAA \mid a$ ,  $B \rightarrow bS \mid aBB \mid b$   
 Obtain the (i) leftmost derivation, and (ii) rightmost derivation for the string "aaabbbabba".
- Design a PDA that accepts  $L = \{a^n b^n c^m \mid n, m \geq 1\}$ . Show acceptability of a string by the PDA by taking suitable example.
- What is the application of pumping lemma, Also prove that  $L = \{a^n b^n \mid n \geq 1\}$  is not Regular Language.
- Define Turing Machine and also construct TM for  $L = \{a^n b^n c^n \mid n \geq 1\}$
- Define and Construct a mealy machine that takes binary input and produces 2's complement of that Number as output. Assume that the string is read from LSB to MSB and end carry discarded.
- Discuss types of Languages and their rule with example.
- State and prove the Pumping Lemma for RL.

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

Q. 3. a. Construct the PDA for the following

(12)

- Accepting all palindromes over  $\{a, b\}$ .
- For the context free grammar  
 $S \rightarrow aSA \mid a$   
 $A \rightarrow bBB \rightarrow b$

b. Identify the type of language

(3)

- i.  $L = \{anbncn \mid n \leq 101010\}$
- ii.  $L = \{anbmcndk \mid n, m, k \geq 1\}$
- iii.  $L = \{wwr \mid w \in (a+b)^+\}$
- iv.  $L = \{anbncndn \mid n \leq 2100\}$
- v.  $L = \{ak \mid k \text{ is prime no}\}$
- vi.  $L = \{anbmck \mid n = m + l\}$

- Q. 4. a. Design Turing Machine to accept the language  $\{ww^R \mid w \text{ is in } (0+1)^*\}$ , where  $w^R$  is the reverse of w. (8)  
b. Prove that vertex cover is NP-complete problem. (7)

- Q. 5. a. What do you mean by ambiguous grammar? The Below Grammar is ambiguous or not (7)  
 $S \rightarrow SS \mid aSb \mid bSa \mid \epsilon$   
 $A \rightarrow aAB \mid a$   
 $B \rightarrow ABb \mid b$   
 b. Design a moore machine accepting the language consisting of strings from  $\Sigma^*$ , where  $\Sigma = \{a, b\}$  and the string should be end with either aba or abb. (8)

- Q. 6. a. Construct a DFA to accept a language L, where all the strings in L are such that total no of a's in them are divisible by 6. (5)  
 b. For  $L = \{101\}^n \mid n \geq 0\}$ , construct NFA and convert it into DFA. (5)  
 c. Write the Regular Expression for the following: (5)  
 i. a language L which accepts all the strings which begin or end with either 00 or 11  
 ii. a language L over  $\Sigma = \{a, b\}$  such that all the string do not contain the substring "ab".  
 iii. Set of all strings over  $\{0, 1\}$  end with '1' and has no substring '00'  
 iv. All Strings over  $\{0, 1\}$  with the substring '1001'  
 v. Start and end with different symbol over  $\{a, b\}$

- Q. 7. a. Define GNF and Construct a grammar in GNF which is equivalent to the grammar (1+6)  
 $S \rightarrow SS \mid 010$   
 $S \rightarrow 0S1 \mid 1 \mid \epsilon$   
 b. Define CNF and Obtain a grammar in Chomsky Normal Form (CNF) equivalent to the grammar G with productions P given (1+7)  
 $S \rightarrow Aba \mid \epsilon$   
 $A \rightarrow aab \mid \epsilon$   
 $B \rightarrow AC$

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## END SEMESTER EXAMINATIONS, JUNE-2018

PROGRAM : B.TECH.(CSE)

SIXTH SEMESTER

COURSE CODE : CCS309

COURSE TITLE : ARTIFICIAL INTELLIGENCE AND FUZZY LOGIC

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections and Questions.

SECTION A

Q. 1. Attempt all questions.

(2 x 10 = 20)

- Define an agent.
- Name at least 5 agent types with percepts actions and goal with environment.
- How will you measure the problem solving performance?
- What are the goals of the pattern recognition?
- What is membership function in Fuzzy Set?
- Define forward chain rule.
- Write a predicate logic statement for "Sita likes anything which Ram likes".
- What is fuzzy logic?
- What is the purpose of defuzzification? Name at least one method used for defuzzification.
- What is context free grammar?

SECTION B

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- Define Turing test. Is Turing test is sufficient to define the operational artificial intelligence?
- How does hill climbing ensure greedy local search? What are the problems of hill climbing?
- Discuss the Basic Fuzzy Set Operation with example.
- Write predicate logic statements for
  - Someone studying in India is smart
  - Ram has an umbrella
  - Anything that has an umbrella is not wet
- Given the following:
  - $C \vee D$
  - $\sim H \Rightarrow (A \wedge \sim B)$
  - $(C \vee D) \Rightarrow \sim H$
  - $(A \wedge \sim B) \Rightarrow (R \vee S)$
 Can  $(R \vee S)$  be inferred from the above?
- Name three strengths and three weaknesses of fuzzy expert systems.
- Explain briefly strong-slot-and-filter structure and weak-slot-and-filter structure.

SECTION C

Attempt any 3 questions.

(15 x 3 = 45)

Q. 3. a. Explain partitioned semantic net with example. Explain factual, sequential and logical knowledge understanding. (5)

b. Define two fuzzy sets  $\tilde{A}$  and  $\tilde{B}$  to represent identification of characters A and B

$$\tilde{A} = \{(F, 0.4), (E, 0.3), (X, 0.1), (Y, 0.1), (I, 0.9), (T, 0.8)\}$$

$$\tilde{B} = \{(F, 0.99), (E, 0.8), (X, 0.1), (Y, 0.2), (I, 0.5), (T, 0.5)\}$$

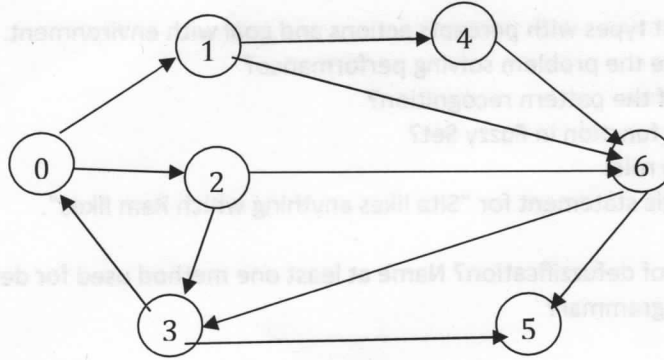
Find the following :

- $\tilde{A} \cup \tilde{B}$
- $\tilde{A} \cap \tilde{B}$
- $\tilde{A} - \tilde{B}$
- $\tilde{A} \cup \tilde{A}^c$
- Verify De Morgan's Law,  $(\tilde{A} \cup \tilde{B})^c = \tilde{A}^c \cap \tilde{B}^c$

(10)

- Q. 4. a. Explain the pattern recognition and classification process. (7)
- b. Explain conceptual dependency and its primitive acts and primitive conceptual category. Convert following sentences into CD: (8)
- John punched Bill
  - Bill ate ice cream with spoon
  - A nice boy
  - John ran

- Q. 5. Show the working of non-recursive DFS algorithm on the following graph: (15)



- Q. 6. a. Explain Chomsky hierarchy of language. Write a note on context free and transformational grammar. (7.5)
- b. Explain fuzzy relation and find the  $R(X,Y) \circ S(Y,Z)$  max-min and max-product composition for following set- (7.5)
- $X = \{0.3/1, 0.4/2, 0.2/3, 0.5/8\}$
- $Y = \{0.4/1, 0.4/2, 0.6/3, 0.4/8\}$
- $Z = \{0.3/1, 0.2/3, 0.1/8\}$
- Q. 7. Write a short notes on the following: (5\*3)
- Shanks conceptual dependency
  - Forward and backward deductions
  - Speech recognitions
  - Prolog
  - Semantics net

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**END SEMESTER EXAMINATION, JUNE - 2018****PROGRAM : B.TECH. (CSE)****SIXTH SEMESTER****COURSE CODE : CCS312****COURSE TITLE : COMPUTER NETWORKS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What are the properties of microwave transmission ?
- b. Write two properties of ring topology
- c. How many bits are used in MAC addresses?
- d. What is the window size of sender in selective repeat?
- e. Define adaptive routing protocol.
- f. What is a sub net?
- g. Name the fields present in the header of UDP.
- h. Define registered port.
- i. What is the function of HTTP?
- j. Define SNMP.

**SECTION B****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. In how many way transmission media can be categorized? Write in detail about wireless media.
- b. What is switching? Differentiate between Packet and Circuit switching.
- c. What is HDLC? Write about techniques used in framing?
- d. Explain any adaptive routing protocol in detail, showing procedure of routing table filling and message exchanged among routers.
- e. How connection is established in TCP? What are the services offered by transport layer to application layer?
- f. Write the function and working of FTP and HTTP.
- g. How congestion is controlled in network layer? Explain token bucket?

**SECTION C**

Attempt any 3 questions.

**(15 x 3 = 45)****Q. 3.** Write in detail about error detected techniques in Data Link Layer? What is CRC? Calculate the CRC if frame is 1010101001 & divisor is 1001.**15****Q. 4.**

- a. Explain the working of selective repeat protocol.
- b. Write in detail about IP addressing.

**8****7****Q. 5.**

- a. An organization is granted the block 150.10.10.0/16. The administrator wants to create 500 subnets. Find

**10**

- i. The subnet mask and default mask
- ii. Numbers of address in each subnet and total hosts

**iii.** The first and last address in subnet 1**iv.** The first and last address in subnet 444

- b. What are private addresses? Why they are required?

**5****Q. 6.** Differentiate between following using suitable example:**15**

- i. IPv4 and IPv6
- ii. UTP and STP
- iii. Subnet Mask and Default Mask

**iv.** TCP and UDP**v.** Switch and Repeater**Q. 7.**

- a. What are three goals of network security? What is public key cryptography? How it is different from Secret key cryptography?

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- b. What are Hamming code? Calculate the hamming code if the frame is 10011001010.

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## END SEMESTER EXAMINATIONS, JUNE - 2018

PROGRAM: B.TECH. (CSE)

SIXTH SEMESTER

COURSE CODE : CCS311

COURSE TITLE : OPERATING SYSTEM

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

**SECTION A**

Q. 1. Attempt all questions.

(2 x 10 = 20)

- What is thrashing?
- Why do we do page replacement? Explain.
- Explain the degree of multiprogramming.
- What are semaphores?
- Explain run time address binding?
- Define Belady's anomaly problem in FIFO.
- What is Operating system? Explain the function of operating systems.
- Differentiate between hard real time system & soft real time system.
- What do you mean by RAG?
- What do you mean by fragmentation?

**SECTION B**

Q. 2. Attempt any 5 questions.

(7 x 5 = 35)

- Under what circumstances page faults occur? Describe the actions taken by the operating system when a page fault occurs.
- Consider a system with 4 processes. Each requires 2 units of resources to complete the execution, then what is the minimum no of resources required to avail deadlock free environment?
- What is tape? Explain with the help of diagram.
- Explain various necessary conditions for the deadlock.
- What is synchronization? Explain the conditions to be followed to achieve synchronization.
- What is process? Explain with the help of process transition diagram.
- What do you mean by IPC?

**SECTION C**

Attempt any 3 questions.

(15 x 3 = 45)

Q. 3. a. Explain the Following:

- Context switching
- System calls
- Throughput
- Dispatcher
- Scheduling queue

- Consider 4 jobs arriving in the ready queue in the same time i.e 1. If the burst time requirement of these processes are 5,7,3,2. What is the completion time for the 3<sup>rd</sup> process? Assuming the shortest job first scheduling algorithm is used.

- Q. 4. a. Using SRTF & LRTF scheduling technique calculates the average Turn Around Time & average Waiting Time for the following processes.

| PROCESS | ARRIVAL TIME | BURST TIME |
|---------|--------------|------------|
| 1       | 2            | 8          |
| 2       | 7            | 1          |
| 3       | 6            | 2          |
| 4       | 3            | 6          |
| 5       | 5            | 9          |

- b. Consider a system with main memory access time is 100 ns and TLB access time is 20 ns and TLB hit ratio is 95% then calculate EMAT with TLB and without TLB.

- Q. 5. a. Consider a system with LAS & PAS equal to  $2^{16}$  Bytes. The memory is byte addressable. The page size is 512 bytes & page table entry size is 2 bytes. The page table entry store beside other information use 4 bytes. How many bytes are still available in the page table?
- b. Consider a system in which 24 bits are used to represent the word or memory. Each word is having the size of 8 Byte. What is the size of memory (in MB)? If RAM chip size is 64B then find the number of chips are required.

- Q. 6. a. Consider the following page reference string:  
2,2,3,4,2,1,5,6,2,1,3,7,6,3,2,1,2,3,6  
How many page faults would occur for the algorithm LRU using three frames?
- b. What do you mean by Deadlock? Use of Banker's algorithm consider a system with four processes  $P_0$  to  $P_3$  and three resource types **A**, **B** and **C**. Resource type **A** has seven instances, resource type **B** has nine instances, and resources type **C** has ten instances. Suppose that at time  $T_0$  the following snapshot of the system has been taken:

|       | MAX |   |   | ALLOCATION |   |   | AVAILABLE |   |   |
|-------|-----|---|---|------------|---|---|-----------|---|---|
|       | A   | B | C | A          | B | C | A         | B | C |
| $P_0$ | 6   | 5 | 4 | 0          | 3 | 4 | 4         | 3 | 1 |
| $P_1$ | 3   | 4 | 2 | 2          | 1 | 2 |           |   |   |
| $P_2$ | 1   | 0 | 4 | 0          | 0 | 2 |           |   |   |
| $P_3$ | 3   | 2 | 5 | 1          | 2 | 1 |           |   |   |

Check that the system is currently in a safe state or not if we use this safe sequence:  $P_1 P_3 P_0 P_2$ . If this sequence is not a safe sequence then find a safe sequence for above snapshot.

- Q. 7. a. Consider a system with three processes  $P_1$ ,  $P_2$  &  $P_3$ . The maximum demand of each process is 5, 9 & 13 respectively for the resources R, What is the minimum number of resources required to ensure the deadlock free?

- b. In disk scheduling algorithm, following is the track requests.

98, 183, 37, 122, 14, 124, 65, 67

Compute the seek time using C-LOOK disk scheduling algorithm if the r/w head presently is on 43.

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**END SEMESTER EXAMINATION, JANUARY-2018****PROGRAM : B.TECH. (CSE)****SEVENTH SEMESTER****COURSE CODE: CCS401****COURSE TITLE: DISTRIBUTED SYSTEMS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. List three properties of distributed systems.
- b. Write down the assumptions on which election algorithms work.
- c. What is the advantage if your server side processing uses threads instead of a single process?
- d. Write the difference between monolithic and micro kernels.
- e. What is a distributed deadlock and why are they hard to detect?
- f. How many election messages will be required in ring algorithm for n processes to complete the election?
- g. What happens during a flat transaction if one of the participants calls for a rollback?
- h. Define critical section problem.
- i. Explain Byzantine and fail-stop failure.
- j. What do you mean by clock skew?

**Section (B)****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Explain ring based election algorithms. Give suitable example to support its working.
- b. Explain quorum-based protocols. Also list the algorithms that can be derived from it.
- c. Prove that the following resource allocation policies prevent deadlocks:
  - i) Ordered requests
  - ii) Collective requests
- d. What do you mean by granularity? Explain the parameters for block size selection.
- e. Compare and contrast Cristian and Berkeley algorithms for clock synchronization.
- f. What is election algorithm? Write down the requirements of election algorithms. Suppose that two processes detect the demise of the coordinator simultaneously and both decide to hold an election using the bully algorithm. Explain the problem that can arise along with the solution.
- g. Explain the distributed DBMS architecture.

**Section (C)**

Attempt any 3 questions.

**(15 x 3 = 45)**

- Q. 3.**
  - a. Discuss the transaction based deadlock prevention schemes with suitable example. (7.5)
  - b. What is RPC? Explain RPC implementation and communication protocols. (7.5)
- Q. 4.**
  - a. Discuss different cache location strategies used in file caching. (7.5)
  - b. What are the various ways for recovery from deadlock? (7.5)
- Q. 5.**
  - a. Explain the working of 2PC protocol for distributed database. (7.5)
  - b. Describe the various issues in designing load-balancing algorithms. (7.5)
- Q. 6.**
  - a. In the design of a DFS, high availability and high scalability are mutually related properties. Discuss. (7.5)
  - b. The centralized algorithms for deadlock detection may detect phantom deadlock. Justify this statement and give a suitable example to support your answer. (7.5)
- Q. 7.**
  - a. Why would you design a system as a distributed system? List some advantages of distributed systems. (7.5)
  - b. Explain Ricart and Agrawala's algorithm with suitable example. Compare its performance and reliability with that of other algorithm being used for mutual exclusion. (7.5)

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## SEMESTER EXAMINATION, JANUARY-2018

PROGRAM : ~~MCA FIFTH SEMESTER~~ / B.TECH.(CSE) SEVENTH SEMESTER

COURSE CODE : MCA302 / CCS402

COURSE TITLE : NETWORK SECURITY &amp; CRYPTOGRAPHY

[Time allotted: Three hours]

[Max. Marks: 100]

Note: Attempt all Sections &amp; Questions.

Section (A)

(2 x 10 = 20)

Q. 1. Attempt all questions.

- Distinguish active and passive attack with example.
- What is confusion?
- Define Euler's theorem and its application.
- What is an Elliptic Curve?
- Mention the scenario where Kerberos scheme is preferred.
- Suppose that two parties A and B wish to setup a common secret key (D-H key) between themselves using the Diffie-Hellman key exchange technique. They agree on 7 as the modulus and 3 as the primitive root. Party A chooses 2 and party B chooses 5 as their respective secrets. Find out their D-H key?
- What is X.509 Standard?
- Consider the following two statements:
  - A hash function (these are often used for computing digital signatures) is an injective function.
  - A encryption technique such as DES performs a permutation on the elements of its input alphabet.
 Which one statement(s) of the above is valid and why?
- Suppose that everyone in a group of N people wants to communicate secretly with the N - 1 others using symmetric Key cryptographic system. The communication between any two person should not be decodable by the others in the group. The numbers of keys required in the system as a whole to satisfy the confidentiality requirement is
- What are honey pots?

Section (B)

(7 x 5 = 35)

Q. 2. Attempt any 5 questions.

- Encrypt the plain text, "pay more money", using Hill Cipher, where the key is
 
$$\begin{Bmatrix} 17 & 17 & 5 \\ 21 & 18 & 21 \\ 2 & 2 & 19 \end{Bmatrix}$$
- What is Kerberos? Explain how it provides authenticated service
- What is Euclid's algorithm? Also find gcd (24140, 16762) using Euclid's algorithm.
- Explain Miller Rabins Primality Testing. Use the same to test the primality of 271, 341. Use base 2.
- Compare the Features of SHA-1 and MD5 algorithm.
- Discuss about the objectives of HMAC and its security features.
- Define S/MIME.

Section (C)

(15 x 3 = 45)

Attempt any 3 questions.

Q. 3. Write short notes on the following:

- ElGamal Public key cryptosystem
- Perform decryption and encryption using RSA algorithm with p=7, q=11, e=17 and M=8.

Q. 4. a. Give the structure of AES. Explain how Encryption/Decryption is done in AES.  
 b. Find the value of  $\phi(100)$  and  $\phi(80)$

Q. 5. Describe the digital signature schemes DSS and ElGamal. What is message authentication? How is it different from message integrity?

Q.6. a. What is the need for security services at transport layer of Internet Protocol?  
 b. Explain the four protocols defined by Secure Socket Layer.

Q.7. a. Explain the compression of Secure Hash Algorithm.  
 b. What are the requirements of hash functions?

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**END SEMESTER EXAMINATION, JANUARY-2018**  
**PROGRAM : B.TECH.(CSE) SEVENTH SEMESTER**

**COURSE CODE : ECS403****COURSE TITLE : ADVANCED CONCEPTS OF NETWORKING****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. Write difference between ARP and RARP.
- b. Explain subnetting and supernetting.
- c. What do you mean by star coupler?
- d. Write short notes on MPLS.
- e. What is site to site VPNs?
- f. Explain SONET.
- g. What are the characteristic of Wireless sensor network?
- h. What do you mean by MAC address?
- i. What do you mean by care of address (COA) in mobile IP?
- j. Explain IPv6 packet format.

**Section (B)****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Describe TCP/IP protocol suite in detail.
- b. Define wireless mesh network. Also explain the channel allocation scheme.
- c. Describe switch fabric. Explain characteristics of switch fabric network.
- d. What are optical networking devices. Explain different type of optical networking device.
- e. Define IP Sec. Also explain two main protocols for IP Sec framework.
- f. What is IP Telephony? Explain H.323 protocol in detail.
- g. What is CSMA? How can you compare 1-persistent and p-persistent CSMA?

**Section (C)**

Attempt any 3 questions.

**(15 x 3 = 45)****Q. 3.** a. What is Classless interdomain routing (CIDR)? Explain slash notation with example.**(7.5)**

b. Write short notes on-

**(7.5)**

i. IEEE 802.3

ii. IEEE 802.11

**Q. 4.** a. Define Blocking switch fabric. Explain omega network with an example.**(7.5)**

b. What do you mean by optical switch? Explain spanke – Benes switchching network.

**(7.5)****Q. 5.** a. What is virtual private network? Explain different type of VPN.**(7.5)**

b. Explain the following-

i. Real time transport protocol

ii. Real time control protocol

**(7.5)****Q. 6.** a. What is wireless adhoc network? Differentiate proactive and reactive protocol.**(7.5)**

b. Explain the Destination Sequenced Distance Vector Routing with suitable example and also differentiate it with Adhoc-on-Demand.

**(7.5)****Q. 7.** a. Explain dynamic source routing protocol in detail with example.**(7.5)**

b. What is wireless sensor network? Explain protocol structure.

**(7.5)**

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**END SEMESTER EXAMINATIONS, JUNE - 2018**  
**PROGRAM : B.TECH.(CSE) EIGHTH SEMESTER**

**COURSE CODE : ECS424****COURSE TITLE : CLOUD COMPUTING****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**SECTION A****Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What is AWS?
- b. Describe Google App engine.
- c. Explain Memory virtualization.
- d. What is the importance of cloud adoption?
- e. Explain utility based computing.
- f. What is the purpose of cloud service management?
- g. Define distributed systems.
- h. Write two differences between SAAS and PAAS.
- i. Define spotcloud.
- j. What is cloud analytics?

**SECTION B****Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Explain VSAN. What are its benefits?
- b. What do you mean by Network Virtualization?
- c. Elaborate Data Protection & Access Management in cloud security.
- d. Discuss about Virtualization security management.
- e. What are the best practices to reduce risks to cloud services?
- f. What are the various cloud requirements that a user must possess?
- g. Explain various cloud rudiments.

**SECTION C****Attempt any 3 questions.****(15 x 3 = 45)**

- Q. 3.**
  - a. Discuss in detail about cloud business process management. **(7.5)**
  - b. Explain virtual desktop infrastructure (VDI) as a cloud offering. **(7.5)**

- Q. 4.**
  - a. State and explain reference models of cloud computing with architectures. **(7.5)**
  - b. Discuss in detail about the key elements of dynamic infrastructure. **(7.5)**

- Q. 5.**
  - a. What are various cloud security policies? **(7.5)**
  - b. What is Software and Infrastructure Security. **(7.5)**

- Q. 6.**
  - a. Discuss in detail about market oriented cloud computing. **(7.5)**
  - b. Explain cloud federation stack. **(7.5)**

- Q. 7.**
  - a. List down various benefits of virtualization. **(7.5)**
  - b. Explain Desktop and application virtualization. **(7.5)**

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**END SEMESTER EXAMINATIONS, JUNE - 2018**  
**PROGRAM : B.TECH.(CSE) EIGHTH SEMESTER**

**COURSE CODE : ECS430****COURSE TITLE : INTRUSION DETECTION SYSTEMS****[Time allotted: Three hours]****[Max. Marks : 100]****Note:** Attempt all Sections & Questions.

**SECTION A**

**Q. 1.** Attempt all questions.**(2 x 10 = 20)**

- a. What is Policy and how does it differ from Law?
- b. What are the modifications required to run the configuration file?
- c. Write the command to run snort on multiple interface?
- d. What do you mean by the below line  
    /opt/snort/bin/snort -c /opt/snort/etc/snort.conf -A fast
- e. What is response? Define the types of responses in IDS.
- f. What can an intrusion detection system catch that a firewall can't?
- g. Write down the rule that generates an alert message whenever it detects an ICMP ping packet with ttl equal to 100.
- h. What are sensors in IDS?
- i. What is ACID?
- j. Write the syntax to create user define rules with example.

**SECTION B**

**Q. 2.** Attempt any 5 questions.**(7 x 5 = 35)**

- a. Discuss the model of IDS and its types.
- b. What is Evasion and insertion attack and how it can be handled in IDS?
- c. Explain Single sensor with database and web interface.
- d. You are given 500 pieces of straw and told that one piece is a needle which looks like straw. How would you find the needle? What other pieces of information would you like to have?
- e. Explain traffic analysis and anomaly detection.
- f. Define rule and rules structure, and create a user define rule with example.
- g. What is snort and how it is related to IDS?

**SECTION C**

Attempt any 3 questions.

**(15 x 3 = 45)**

- Q. 3.** a. How does a false negative alarm differ from a false positive one from a security perspective? Which is least desirable?  
b. Explain host based Intrusion Detection Systems.
- Q. 4.** a. How to use mysql with snort? Explain all the steps with example.  
b. How to drop all the tables in a database with snort?
- Q. 5.** Write short notes on:  
a. Winpcap  
b. Snort  
c. ACID
- Q. 6.** a. What is rule and rule headers? Discuss the rule options.  
b. What is the first bad rule?
- Q. 7.** a. What is preprocessor and how it can be enabled in a configuration file, explain with example  
b. What is Output Plugin and how it can be created and implemented in snort?

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