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# ARKA JAIN University, Jharkhand

2<sup>nd</sup> Semester Final Examination – 2018-19

Subject : Data Structure

Time : 3 Hours

Course: BCA/BSCIT

Full Marks : 70

Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
- **Part- B** contains **SIX** questions out of which **FOUR** questions are to be answered.
- **Part- C** contains **SIX** questions out of which **THREE** questions are to be answered.

## PART A

Q.1) All questions are compulsory

A) Multiple Choice Questions :

(10x1=10)

- a) Stack is use for
- CPU resource allocation
  - breadth first search traversal
  - recursion
  - none of the above
- b) The following formula is for  
left( $\leq K$ ) root (k) right( $>k$ )
- Binary tree
  - stack
  - link list
  - binary search tree
- c) ..... is very useful in situation when data have to stored and then retrieved in reverse order.
- Stack
  - Queue
  - List
  - Link list
- d) Which of the following data structure is non linear type?
- Strings
  - Lists
  - Stacks
  - Graph
- e) Match the following.
- |                     |   |
|---------------------|---|
| a) Completeness     | i) How long does it take to find a solution                             |
| b) Time Complexity  | ii) How much memory need to perform the search.                         |
| c) Space Complexity | iii) Is the strategy guaranteed to find the solution when there in one. |
- a-iii, b-ii, c-i
  - a-i, b-ii, c-iii
  - a-iii, b-i, c-ii
  - a-i, b-iii, c-ii

f) State True or False.

a) Binary search is used for searching in a sorted array.

b) The time complexity of binary search is  $O(\log n)$ .

- i) True, False
- ii) False, True
- iii) False, False
- iv) True, True

g) Which of the following data structure store the homogeneous data elements?

- i) Arrays
- ii) Records
- iii) Pointers
- iv) Lists

h) A data structure where elements can be added or removed at either end but not in the middle is called ...

- i) linked lists
- ii) stacks
- iii) queues
- iv) dequeue

i) binary tree with all the leaf node at the same level

- i) strictly binary tree
- ii) complete binary tree
- iii) binary search tree
- iv) none of the above

j) a node with both left and right child address as NULL

- i) parent node
- ii) child node
- iii) root node
- iv) siblings

**B] Very Short question**

**(5x2=10)**

- a) what is linear search and binary search method?
- b) what is dynamic memory allocation?
- c) what is complete binary tree?
- d) what is circular link list?
- e) what is the difference between stack and queue?

## PART B

**Q.2) Answer any four:**

**(4x5=20)**

- i) what is queue? mention its underflow and overflow condition with example?
- ii) define binary search tree give an example?
- iii) what are non-primitive data types? explain in detail?
- iv) state and explain insertion sort with an example?
- v) what is a doubly linked list? explain in detail?
- vi) What is recursion? State the types of recursion with example?

## PART C

**Answer any three:**

**(3x10=30)**

**Q.3)** Write an Algorithm to insert a node at the end of circular Linked List.

**Q.4)** what do you mean by PUSH and POP operation in a STACK? Write separate functions to implement PUSH and POP operation

**Q.5)** Convert the following expression from infix to Postfix using stack  
 $A+(B*C-(D/E^F)*G)*H$

**Q.6)** What are the advantages of Double Linked List as compared to Single Linked List? Write an algorithm to delete a first node from Double Linked List.

**Q.7)** Write the steps to sort the following list of unsorted elements using Quick Sort.

60 26 85 31 4 13 87 76 73 20

**Q.8)** What is the difference between linear search and binary search? Explain with example



## ARKA JAIN University, Jharkhand

2nd Semester Final Examination – 2018-19

Subject : Programming with C++

Time : 3 Hours

Course: BCA/Bsc(IT)

Full Marks : 70

Pass Marks: 28

- 
- Candidates are required to give their answers in their own words as far as practicable.
  - Question Paper is divided into **Three Parts –A, B & C**
  - **Part-A** is compulsory.
  - **Part- B** contains **SIX** questions out of which **FOUR** questions are to be answered.
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- 

### PART A

Q.1) All questions are compulsory

(10x1=10)

- a. Which of the following is not a type of constructor?
- Copy constructor
  - Friend constructor
  - Default constructor
  - Parameterized constructor
- b. Which of the following cannot be friend?
- Function
  - Class
  - Object
  - Operator function
- c. cout is a/an \_\_\_\_\_ .?
- operator
  - function
  - object
  - None of the above
- d. Which of the following is correct about function overloading?
- The types of arguments are different.
  - The order of argument is different.
  - The number of argument is same.
  - Both A and B.
- e. Which inheritance type is used in the class given below?
- ```
class A : public X, public Y
{
}

```
- Multilevel inheritance
  - Hybrid inheritance
  - Hierarchical Inheritance
  - Multiple inheritances

- f. Which of the following statement is correct?
- A constructor is called at the time of declaration of an object.
  - A constructor is called at the time of use of an object.
  - A constructor is called at the time of declaration of a class.
  - A constructor is called at the time of use of a class.
- g. Everything defined at the program scope level (ie. outside functions and classes) is said to be \_\_\_\_\_
- local scope
  - regional scope
  - global scope
  - static scope
- h. Which operator is used to declare the destructor?
- #
  - \$
  - ~
  - @
- i. Member of a class specified as \_\_\_\_\_ are accessible only to method of the class.
- private
  - public
  - protected
  - derive
- j. A \_\_\_\_\_ is a special method whose name is same as the name of the class.
- member function
  - static function
  - constructor
  - structure

**B] Very Short question**

(5x2=10)

- Define Encapsulation.
- What is a destructor? Give example.
- What are default arguments?
- What is a static data member?
- Define class and object.

**PART B**

**Q2) Answer any four:**

(4x5=20)

- List the features of Object Oriented Programming.
- What are inline functions? Example with suitable example.
- Explain the concept of function overloading with suitable example.
- Write a program to compute the area of a triangle, rectangle and a circle by overloading the area() function.
- What is static function? How do we declare a member of a class static?
- Explain private and public mode of inheritance with suitable example.

### PART C

Answer any three:

(3x10=30)

- Q3) What are the characteristics of a constructor? Explain its various types with suitable example.
- Q4) Design three classes student, test and results where result is inherited from test and test is inherited from student. Write functions to initialize the vales. Also write a main function for execution by creating objects.
- Q5) What is operator overloading? Write a program to overload the ++ unary operator for demonstrating operator overloading.
- Q6) What is inheritance? Explain different types of inheritance with example.
- Q7) Write a C++ program to overload binary + operator to add two objects **A** and **B** and store the output in a third object **C**. The class has an **int** data member as **n**.  
Example: **C = A + B**
- Q8) Write a program that creates a class **Rectangle** with 2 data members (**length and breadth**), 2 constructors, and the following member functions
- Default constructor which initializes length and breadth to 0(zero).
  - Parameterized Constructor that takes two arguments, length and breadth.
  - Copy Constructor
  - Sets length and breadth.
  - Calculate the area.
  - Calculate the perimeter.

- f. Which of the following statement is correct?
- A constructor is called at the time of declaration of an object.
  - A constructor is called at the time of use of an object.
  - A constructor is called at the time of declaration of a class.
  - A constructor is called at the time of use of a class.
- g. Everything defined at the program scope level (ie. outside functions and classes) is said to be \_\_\_\_\_.
- local scope
  - regional scope
  - global scope
  - static scope
- h. Which operator is used to declare the destructor?
- #
  - \$
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  - @
- i. Member of a class specified as \_\_\_\_\_ are accessible only to method of the class.
- private
  - public
  - protected
  - derive
- j. A \_\_\_\_\_ is a special method whose name is same as the name of the class.
- member function
  - static function
  - constructor
  - structure

**B] Very Short question**

(5x2=10)

- Define Encapsulation.
- What is a destructor? Give example.
- What are default arguments?
- What is a static data member?
- Define class and object.

**PART B**

**Q2) Answer any four:**

(4x5=20)

- List the features of Object Oriented Programming.
- What are inline functions? Example with suitable example.
- Explain the concept of function overloading with suitable example.
- Write a program to compute the area of a triangle, rectangle and a circle by overloading the area() function.
- What is static function? How do we declare a member of a class static?
- Explain private and public mode of inheritance with suitable example.



# ARKA JAIN University, Jharkhand

2nd Semester Final Examination - 2018-19

Subject : Operating System

Time : 3 Hours

Course: BCA/BSCIT

Full Marks : 70

Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A,B& C**
- **Part-A** is compulsory.
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- **Part- C** contains **SIX** questions out of which **THREE** questions are to be answered.

Set I

## PART A

Q.1) All questions are compulsory

A) Multiple Choice Questions :

(10x1=10)

i) Which of the following is a Real Time Operating System.

- a) Industrial Control System
- b) Novell netware
- c) Multics
- d) None of these.

ii) What is operating system?

- a) collection of programs that manages hardware resources
- b) system service provider to the application programs
- c) link to interface the hardware and application programs
- d) all of the mentioned

iii) Which scheduling algorithm allocates the CPU first to the process that requests the CPU first?

- a) first-come, first-served scheduling
- b) shortest job scheduling
- c) priority scheduling
- d) none of the mentioned

iv) A memory buffer used to accommodate a speed differential is called

- a) stack pointer
- b) cache
- c) accumulator
- d) disk buffer

v) CPU fetches the instruction from memory according to the value of

- a) program counter
- b) status register
- c) instruction register
- d) program status word



vi) Which of the following condition is required for deadlock to be possible?

- a) mutual exclusion
- b) a process may hold allocated resources while awaiting assignment of other resources
- c) no resource can be forcibly removed from a process holding it
- d) all of the mentioned

vii) If a process is executing in its critical section, then no other processes can be executing in their critical section. This condition is called

- a) mutual exclusion
- b) critical exclusion
- c) synchronous exclusion
- d) asynchronous exclusion

viii) Which one of the following is a synchronization tool?

- a) thread
- b) pipe
- c) semaphore
- d) socket

ix) Process synchronization can be done on

- a) hardware level
- b) software level
- c) both hardware and software level
- d) none of the mentioned

x) The circular wait condition can be prevented by

- a) defining a linear ordering of resource types
- b) using thread
- c) using pipes
- d) all of the mentioned

**B] Very Short question**

(5x2=10)

- a) What is an Operating System?
- b) Write down the history of operating system.
- c) List down the different types of operating system.
- d) What do you mean by Real time operating system?
- e) Discuss the necessary conditions that cause deadlock situation to occur.

**PART B**

**Q.2) Answer any four:**

(4x5=20)

- i) Explain the functions performed by the operating system.
- ii) Explain the process scheduling with neat diagram in operating system?
- iii) Explain the advantages of threads over processes.
- iv) Write down the definition of semaphore and explain its different types.
- v) Explain VMM and different types of VMM.
- vi) Write down the differences between Multiprocessor and Multicomputer.

### PART C

Answer any three:

(3x10=30)

Q.3) Explain Time sharing Operating System, multiprogramming operating system and Batch processing operating system with respect to scheduling.

Q.4) Define Critical section problem. Write down the solution to the critical section problem.

Q.5) Explain Paging Technique with neat diagram and example.

Q.6) What do you mean by Multiprocessor? Write down the applications of Multiprocessor?

Q.7) What do you mean by virtualization in operating system? Explain in brief.

Q.8) Explain Shortest Job Next scheduling policy using following set of processes.

| Proceses        | P1 | P2 | P3 | P4 | P5 |
|-----------------|----|----|----|----|----|
| Admisssion Time | 0  | 2  | 3  | 4  | 8  |
| Service Time    | 3  | 3  | 5  | 2  | 3  |



## ARKA JAIN University, Jharkhand

2nd Semester Examination - 2017-18

Subject: Numerical and statistical methods

Course: BCA/Bsc(IT)

Full Marks : 70

Time : 3 Hours

Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
- **Part- B** contains **SIX** questions out of which **FOUR** questions are to be answered.
- **Part- C** contains **SIX** questions out of which **THREE** questions are to be answered.

### PART A

Q.1) All questions are compulsory

- a) Round off value of number 2.35467 correct up to four significant figures is
- 2.354
  - 2.35400
  - 0.3546
  - None of these
- b) inherent error occurs due to
- Error occurs due to error in statement
  - Errors due to rounding off the numbers
  - Errors due to replacing infinite series by finite one.
  - None of these
- c) The relative error in taking  $\pi = 3.141593$  as  $\frac{22}{7}$ ?
- 0.1234
  - 0.0004
  - 0.0024
  - None of these
- d) In gauss elimination method for solving a system of linear equations, triangularization leads to
- Diagonal matrix
  - Lower triangular matrix
  - Upper triangular matrix
  - Singular matrix
- e) If  $c$  is any constant then  $\Delta c = ?$
- 0
  - 1
  - Not defined
  - None of these

f) A fair coin is tossed 6 times .what is the probability of getting atleast 3 heads

- i) 11/16
- ii) 21/32
- iii) 3/4
- iv) 5/6

g) Trapezoidal rule is also called

- i)  $n=1$  rule
- ii)  $n=2$  rule
- iii)  $n=3$  rule
- iv) None of these

h)  $\Delta f(x)=?$

- i)  $f(x)-f(x-h)$
- ii)  $f(x)=f(x-h)$
- iii)  $f(x+h)-f(x)$
- iv) none of these

i) The regression line x on y is defined as

- i)  $y-\bar{y}=b_{yx}(x-\bar{x})$
- ii)  $x-\bar{x}=b_{xy}(y-\bar{y})$
- iii)  $y=b_{yx}x$
- iv) none of these

j)  $\nabla^2 y_2=?$

- i)  $y_2-2y_1+y_0$
- ii)  $y_3-y_2$
- iii)  $y_3+y_2$
- iv) none of these

### B] Very Short question

(5x2=10)

- a) Write down the general formula of Picard's iteration formula?
- b) Define percentage error?
- c) Write down the formula of Newton's forward difference formula?
- d) A coin is tossed 3 times what is the probability to get two heads?
- e) Evaluate  $\Delta \tan^{-1} x$ .

### PART B

Q.2) Answer any four:

(4x5=20)

i) find the cubic polynomial which takes following values

|       |   |   |   |    |
|-------|---|---|---|----|
| X:    | 0 | 1 | 2 | 3  |
| F(x): | 1 | 2 | 1 | 10 |

Using Newton's forward difference interpolation formula. find  $f(4)$  and  $f'(4)$ .

ii) solve the following system of the equation by gauss elimination method

$$\begin{aligned}x+5y+z &= 17 \\ 2x+y+3z &= 13 \\ 3x+y+4z &= 17\end{aligned}$$

iii) find the real root of the equation  $x^3 - 4x - 9 = 0$  by the regula Falsi method correct upto 4 decimal places

iv) Using Taylor's series method, find the value of  $y(0.1)$  given  $\frac{dy}{dx} = x^2 + y^2$  and  $y(0) = 1$

v) Find  $y'(0)$  and  $y''(0)$  from the following table

|    |   |   |    |   |   |   |
|----|---|---|----|---|---|---|
| x: | 0 | 1 | 2  | 3 | 4 | 5 |
| y: | 4 | 8 | 15 | 7 | 6 | 2 |

vi) A die is tossed 180 times. Find the expected number ( $\mu$ ) of the times the face with the number 5 will appear. Also find the standard deviation and variance.

### PART C

Answer any three:

(3x10=30)

Q.3) find the mean and standard deviation of binomial distribution?

Q.4) Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  by using (i) trapezoidal rule (ii) Simpson's 1/3 rule (iii) Simpson's 3/8 rule

Q.5) Using Picard methods to obtained the approximate solution of the ODE  $\frac{dy}{dx} = x^2 + y^2$  for  $x=0.4$

Given  $y(0) = 0$

Q.6) find the real root of the equation  $x^3 - x - 4 = 0$  using bisection method correct up to 3 decimal places

Q.7) The values of x and y are given as below:

X: 5      6      9      11

Y: 12     13     14     16

Find the value of Y when  $x=10$ . Using Lagrange's interpolation formula.

Q.8) Solve the following system of equation by gauss Jordan method;

$$x + y + z = 9$$

$$2x - 3y + 4z = 13$$

$$3x + 4y + 5z = 40$$



# ARKA JAIN University, Jharkhand

2nd Semester Final Examination - 2018-19

Subject : English

Time : 3 Hours

Course: BCA/ BSCIT

Full Marks : 70

Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
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- **Part-A** is compulsory.
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## PART A

Q.1) All questions are compulsory

A] Fill in the blank :(10x1=10)

- He gave his mother an extravagant gift after the argument. In spite of everything. (rewrite the statement)
- The boys snuck home late that night. Then waited for the consequences.(rewrite the statement)
- In case you haven't noticed my real name doesn't appear in the article. (Punctuate the statement)
- The cat was licking it's tail.(Punctuate the statement)
- How lucky I was!(Rewrite as assertive)
- She excepted his offer to drive her home.(correct the sentence)
- It was a breathe of fresh air to meet someone so genuine.(correct the sentence)
- He wants to get a degree in engineering, or medicine.(correct the sentence)
- If I was a surgeon,I would have treated the patient. .(correct the sentence)
- I cannot be able to operate this machine. .(correct the sentence)
- This kind of movie fascinates the youth more than it does adults.  
Begin :The youth.....

B] Read the passage and answer following questions

(1x10=10)

Many years ago, at the foothills of the Kaatskill (Kat-skill) mountains, was a little village. In the village lived a simple, good-natured fellow named Rip Van Winkle. He was a kind neighbour, ready to help anyone. Everyone in the village liked him. The children of the village shouted with joy whenever they saw him because he played with them, he taught them to fly kites and shoot marbles, and told them long stories. The only problem with Rip was that he was very lazy. He did no work on his own farm and just idled away his time. His fences were falling to pieces.

- Where was the little village situated?
- What kind of a man was Rip?
- Why did everyone in the village like him?
- Why did the children of the village like him ?
- What was the problem with Rip ?
- What did he do all day long?
- Write the name of the lesson ?
- Write the past tense of :- teach - \_\_\_\_\_ play - \_\_\_\_\_
- Find out a word from the passage which means - Wasting time away \_\_\_\_\_
- Complete the sentence He did no work on his own farm \_\_\_\_\_.

**PART B**

**Q.2) Write short notes on any four with examples**

**(4x5=20)**

- i. What is Sonnet? Which one did you read? Write its summary.
- ii. Justify the theme of the poem Break Break Break?
- iii. Which poem is a report on the poet's experience? Write the summary of the poem.
- iv. The harsh reality of today's generation is that children fail to care for their aged parents. Do you agree/disagree to the given statement? Explain your answer with reference to the drama, Dera Departed.
- v. What were the three extraordinary things that helped the narrator to build the story The Face on the Wall?
- vi. Scientific point of view is an elaboration on scientific outlook. Explain

**PART C**

**Answer any three:**

**(3x10=30)**

- Q.3)** The Sonnet 116 has rendered what love is and what it is not. Justify the theme of the poem.
- Q.4)** What is the moral of the play, The Dear Departed?
- Q.5)** If you were the narrator of the story 'Face on the Wall', how would you come up with the climax and how could you use the three extraordinary things to create a new fiction?
- Q.6)** What is the difference between a scientific approach and a conventional approach to the various problems of life? Which, in Haldane's opinion, is better?
- Q.7)** How would you justify the title of Henry Vaughan's poem "The Retreat"?



## ARKA JAIN University, Jharkhand

Second Semester Examination – 2018-19

Subject: IT Awareness

Course: BCA/BSCIT

Time: 2 Hours

Full Marks: 35

Pass Marks: 14

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A & C** are compulsory.
- **Part- B** contains **SIX** questions out of which **Four** questions are to be answered.

### PART A

Q.1) All questions are compulsory

Multiple Choice Questions:

(10x1=10)

- a) Employees First Slogan belongs to  
i) Paytm ii) HCL iii) Yahoo iv) Facebook
- b) Tata Sky controlled revenue linkage with  
i) HOBS Integrated Revenue ii) Azure iii) paypal iv) None
- c) Jile application is supported by  
i) TCS ii) IBM iii) Microsoft iv) Google
- d) #AIforAll program was launch by  
i) USA ii) India iii) China iv) South Africa
- e) TCS SIAM Frame work is used in  
i) Oil and Gas Firm ii) Manufacturing iii) Procurement iv) Telecommunication
- f) V.G. sidhartha is founder member of  
g) i) Mintree ii) Microsoft iii) oracle iv) Infosys
- h) Optumera is a digital merchandising application developed by  
i) Opera ii) Infosys iii) IBM iv) TCS
- i) Shiv Nadar is Founder Member of of  
i) HCL ii) MindTree iii) rolta iv) NONE
- j) HotelTonight online app provide service in  
i) America ii) Europe iii) Australia iv) All above



**PART B**



**Q.2) Answer any Four:**

**(4x5=20)**

- i) Discuss the role IT in banking sector.
- ii) Discuss the significance of cloud computing applications.
- iii) Explain the History, working area and opportunity in Infosys.
- iv) What was the role of TCS in the development of Indian IT industry?
- v) What are the threats of Indian IT Industry?
- vi) What are the significance of Block chain concept?

**PART C**

**Q.3) Discuss the role of AI Technology in Smart Cities and infrastructure. (1x5=5)**