

U.G. 6th Semester Examination - 2021

COMPUTER SCIENCE

Course Code : BCOSDSRC3 & 4 (DSE 3 & 4)

Full Marks : 30

Time : 2 Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

*This question papers contains both DSE 3 & 4.
Students are thereby instructed to answer DSE paper out of these two (DSE 3 & DSE 4) as he/she opted for.*

Title : Programming in Java

Code : BCOSDSRC3 (DSE 3)

1. Choose the correct alternative for any **ten** of the following: 1×10=10
- a) In which process, a local variable has the same name as one of the instance variables?
 - i) Serialization
 - ii) Variable Shadowing
 - iii) Abstraction
 - iv) Multi-threading

- b) Which package contains the Random class?
 - i) java.util package
 - ii) java.lang package
 - iii) java.awt package
 - iv) java.io package
- c) Which option is false about the final keyword?
 - i) A final method cannot be overridden in its subclasses.
 - ii) A final class cannot be extended.
 - iii) A final class cannot extend other classes.
 - iv) A final method can be inherited.
- d) Which of these classes are the direct subclasses of the Throwable class?
 - i) Runtime Exception and Error class
 - ii) Exception and Virtual Machine Error class
 - iii) Error and Exception class
 - iv) IO Exception and Virtual Machine Error class
- e) Which of the following is a reserved keyword in Java?
 - i) object
 - ii) strictfp
 - iii) main
 - iv) system

- f) Which keyword is used for accessing the features of a package?
- i) package
 - ii) import
 - iii) extends
 - iv) export
- g) In java, jar stands for _____
- i) Java Archive Runner
 - ii) Java Application Resource
 - iii) Java Application Runner
 - iv) None of the above
- h) How many threads can be executed at a time?
- i) Only one thread
 - ii) Multiple threads
 - iii) Only main (main() method) thread
 - iv) Two threads
- i) Which of this keyword can be used in a subclass to call the constructor of superclass?
- i) super
 - ii) this
 - iii) extent
 - iv) extends
- j) Which of these is correct way of calling a constructor having no parameters, of superclass A by subclass B?
- i) super(void);
 - ii) superclass.();
 - iii) super.A();
 - iv) super();
- k) What is polymorphism?
- l) Which of the following is a method having same name as that of its class?
- i) finalize
 - ii) delete
 - iii) class
 - iv) constructor
- m) Which function is used to perform some action when the object is to be destroyed?
- i) finalize()
 - ii) delete()
 - iii) main()
 - iv) none of the mentioned
- n) Which of these statement is incorrect?
- i) Every class must contain a main() method
 - ii) Applets do not require a main() method at all

- iii) There can be only one main() method in a program
- iv) main() method must be made public
- o) Which of these access specifiers must be used for main() method?
 - i) private
 - ii) public
 - iii) protected
 - iv) none of the mentioned

2. Answer any **five** questions: 2×5=10

- a) Differentiate between object and class.
- b) What do you mean by garbage collection?
- c) What is the use of extends keyword in java?
- d) What are access modifiers in Java? Illustrate with examples.
- e) What is JVM?
- f) What is finally block in java?
- g) Why multiple inheritance is not allowed in java?
- h) What is super class?

3. Answer any **two** questions: 5×2=10

- a) What is runtime polymorphism? Differentiate overriding and overloading. Write program for overloading. 1+2+2
- b) Discuss the event handling mechanism in Java.
- c) What is Inheritance? Write java program to implement multiple inheritance.

Title : Data Structures

Code : BCOSDSRC4 (DSE 4)

1. Answer any **ten** questions: 1×10=10

- a) What is Data Structure?
- b) What do you mean by depth of a node?
- c) What do you mean by an Array?
- d) What do you mean by sparse Matrix?
- e) What is BST?
- f) Write down the time complexity of linear Search Algorithm.
- g) How much memory (in byte) will be allocated for the two dimension array A[15][5].
- h) What is Base case condition?
- i) Which data structure allows deleting data elements from the front and inserting at rear?
- j) To represent hierarchical relationship between elements which data structure is suitable -
 - a) Deque
 - b) Priority queue
 - c) Tree
 - d) All of the above

- k) The post order traversal of a binary tree is defca. Find out the preorder traversal -
- abfcde
 - adbfec
 - abdecf
 - abdcef
- l) Which of the following case does not exist in complexity theory?
- Best case
 - Worst case
 - Average case
 - Null case
- m) In linked list there are no NULL link in -
- Single linked list
 - Linear linked list
 - Circular linked list
 - None of the above
- n) Which of the following data structure can store non-homogeneous data elements?
- Array
 - Pointer
 - Stacks
 - None of these
- o) What is an AVL tree?

2. Answer any **five** questions: 2×5=10
- Write the difference between Stack and Queue.
 - Write the algorithm of insertion sort.
 - Convert Infix to Prefix expression :
 $(a+b*(c+d))*e$
 - Sort the Numbers 44, 22, 11, 13, 5 using Bubble sort Algorithm.
 - Write the advantages of linked list over arrays.
 - What is the space and time complexity of an algorithm?
 - Define abstract data type.
 - What are the different types of hash collision techniques?
3. Answer any **two** questions: 5×2=10
- Explain the PUSH and POP operations of a stack. Define priority Queue. 4+1
 - Explain Bubble sort with an example.
 - Explain Collision Resolution Techniques in brief?
