CS203 Java Programming and Applications Fall 2022

Assignment II

Due Date: 1st December @ 23:59

Submit a zip file of pdf of the section A, a .java file of the section B along side with screenshot of the output of your code.

Section A(1mark each)

1. The do-while loop repeats a set of code at least once before the condition is tested.
   a) False
   b) True

2. Which of the following statements correctly describes the relation between an object and the instance variable it stores *except*?
   a) Each new object has its own distinctive set of instance variables
   b) Each object has a copy of the instance variables of its class
   c) the instance variable of each object are separate from the variables of other objects
   d) The instance variables of each object are stored together with the variables of other objects

3. What feature of OOP has a super-class sub-class concept?
   a) Hierarchical inheritance
   b) Single inheritance
   c) Multiple inheritances
   d) Multilevel inheritance

4. Which of these operators is used to allocate memory to array variable in Java?
   a) alloc
   b) Malloc
   c) new malloc
   d) new
   e)
5. Data type long literals are appended by _____
   a) Uppercase L
   b) Lowercase L
   c) Long
   d) Both A & B
   e)
6. What are the three OOPs principles?
7. What is the difference between final and static variable?
8. What is mean by garbage collection?
9. What is a constructor?

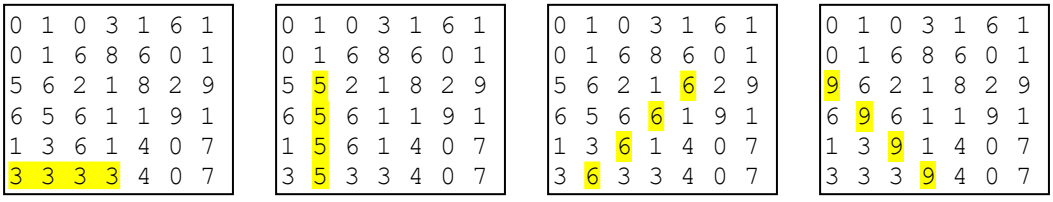
10. All the following statements accurately describe the use of access modifiers within a class definition except?

a) They can be applied to both data & methods
b) They must precede a class's data variables or methods
c) They can follow a class's data variables or methods
d) They can appear in any order

SECTION B – 90 marks

1. Write the following function that tests whether a two-dimensional list has 4 consecutive numbers of the same value, either horizontally, vertically, or diagonally.

Write a test program that prompts that randomly generates the number of rows and columns of a two-dimensional list and then the values in the list and displays True if the list contains four consecutive numbers with the same value along side with the array. Otherwise, display False. Here are some examples of the true cases:



2. Design a class named MyInteger. The class contains:
    - An int data field named value that stores the int value represented by this object.
    - A constructor that creates a MyInteger object for the specified int value.
    - A get method that returns the int value.
    - Methods isEven(), isOdd(), and isPrime() that return true if the value is even, odd, or prime, respectively.
    - Static methods isEven(int), isOdd(int), and isPrime(int) that return true if the specified value is even, odd, or prime, respectively.
    - Static methods isEven(MyInteger), isOdd(MyInteger), and isPrime(MyInteger) that return true if the specified value is even, odd, or prime, respectively.
    - Methods equals(int) and equals(MyInteger) that return true if the value in the object is equal to the specified value.

- A static method parseInt(char[]) that converts an array of numeric characters to an int value.
- A static method parseInt(String) that converts a string into an int value.

Draw the UML diagram for the class. Implement the class. Write a client program that tests all methods in the class.