2024 Session 2

Practice Final Exam

50 Points Possible

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Details

The final exam is a pen-and-paper based closed book exam. So, it is recommended that you answer these Practice questions using pen-and-paper instead of typing on your device.

Practice Final Exam

Part A: Multiple Choice Questions: 6 x 1 = 6 marks

Q1 The result of dividing by 0 in Java is a ___? 1 mark

a) Runtime exception
b) Runtime error
c) Compile-time exception
d) Compile/Time error

Q2 Select the correct method that can overload the following method? 1 mark

```
public void addNewString(int s) {}
```

a) public int addNewInt(s String s)
b) public void addNewString(s int s) ✓
c) public void addNewString(s int, int s)
d) public String addNewString(s int) ✗

It's not override

Q3 True/False: We can pass objects as method arguments in Java 1 mark

a) True
b) False

Q4 True/False: It is possible to extend an interface 1 mark

a) True
b) False

interfaces can extend interfaces

Q5 Parent class of all java classes is _____? 1 mark

a) JavaLang.Object
b) JavaLang.Object
c) JavaLang.System
d) JavaLang.System

Q6 Assume we have implemented two classes called Pet and Vehicle.
Which of the following commands compile classes Pet, Vehicle and then run Pet?
Pet.class Vehicle.class Pet

a) javac *.java Pet
b) javac Pet, Vehicle.java Pet
c) javac Vehicle.java Pet.java Pet.class
d) javac Vehicle.java Pet.java Vehicle.java

Part B: Analysing code: 4 x 2 = 8 marks

Q1 What will be the output of the following program? 2 marks

```
import java.util.Arrays;

public class ArrayTest {

    String mySkills[] = { "C++", "RDBMS" };
    String myWills[];

    public static void main(String args[]) {

        String mySkills[] = { "Python", "Java" };

        updateSkills(mySkills);

        System.out.println(Arrays.toString(mySkills));
    }

    public static String[] updateSkills(String mySkills[]) {

        String newSkills[] = { "HTML" };

        myWills = newSkills;

        return mySkills;
    }
}
```

a) Python, Java
b) Python, Java, HTML
c) HTML
d) C++, DOM, HTML
e) Compile error

Q2 What will be the output of the following program? 2 marks

```
public class StringTest
{
    public static void main(String[] args)
    {
        String text = "Spring is really serious";

        System.out.out.println(text.replaceFirst("s", "t ", " + text.contains("ous"));

        text = text.substring(1, 12) + "Mars";

        String[] arr = text.split(" ");

        System.out.out.println(arrays + " " + arr[1].length());
    }
}
```

a) 3 false 3 ✗
b) 4 false 3 ✗
c) 3 true 3 ✗
d) 3 true 4 ✗
e) Compile error

Q3 What will be the output of the following program? 2 marks

```
1  interface A{
2      public default void myMethod(){
3          System.out.println("A");
4      }
5  }
6
7  interface B{
8      public static void myMethod(){
9          System.out.println("B");
10     }
11 }
12
13 class MyClass implements A, B{
14
15 }
16
17 public class InterfaceDemo{
18
19     public static void main(String[] args){
20
21         new MyClass().myMethod();
22     }
23 }
```

a) No Output
b) A
c) B
d) Compile error

Q4 What will be the output of the following program? 2 marks

```
1  interface A{
2      public default void myMethod(){
3          System.out.println("A");
4      }
5  }
6
7  interface B{
8      public static void myMethod(){
9          System.out.println("B");
10     }
11 }
12
13 class MyClass implements A, B{
14
15 }
16
17 public class InterfaceDemo{
18
19     public static void main(String[] args){
20
21         new MyClass().myMethod();
22     }
23 }
```

B. myMethod();

a) No Output
b) A
c) B
d) Compile error

Q5 What will be the output of the following program? 2 marks

```
1  public class RecursionDemo{
2
3      public void myMethod(int n){
4          if(n / 2 == 1) System.out.print("P");
5          else{
6              System.out.print("O");
7              myMethod(n - 1);
8          }
9      }
10
11     public static void main(String[] args){
12         new RecursionDemo().myMethod(4);
13     }
14 }
```

a) P
O
O
P

b) O
O
P
P

c) O
O
O
P

d) P
P
P
O

4 0
3 0
2 0
1 P

Part C: Short Answer Questions: 4 x 9 = 36 marks

Q1. Create a class GiftCard that represents a gift card for the purchase of books online. It should have the following private attributes: 9 marks

- amount - the amount of money on the card

and the following public methods:

- GiftCard(double amount) - a constructor to initialise the card
- void buy(double totalPrice) - records the purchase of books by decreasing the amount of money used for purchase using this card and prints "Books bought successfully". Print an error message if the gift card does not have sufficient amount to pay the totalPrice.
- double amountRemaining() - returns the remaining amount of money in the gift card.

class GiftCard {
private double amount;
public GiftCard(double amount){
this.amount = amount;
}
public void buy(double totalPrice){
if (totalPrice > amount){
System.out.println("Not Enough Money in the Card");
} else {
this.amount -= totalPrice;
System.out.println("Books bought successfully");
}
}
public double amountRemaining() {
return amount;
}
}

GiftCard
- amount: double
+ GiftCard(double) + buy(double totalPrice): void + amountRemaining(): double

Your program should work with the following test program, to produce the expected output shown below.

```
public class TestClass
{
    public static void main(String[] args)
    {
        GiftCard g = new GiftCard(10);

        g.buy(0.5);

        g.buy(0.5);

        g.buy(0.5);

        System.out.println("Remaining balance: " + g.amountRemaining());
    }
}
```

Expected Output:

```
Books bought successfully

Books bought successfully

Not enough money in the card

Remaining balance: 9.0
```

public void buy(double totalPrice){
if (totalPrice > amount){
System.out.println("Not Enough Money in the Card");
} else {
this.amount -= totalPrice;
System.out.println("Books bought successfully");
}
}
public double amountRemaining() {
return amount;
}
}

Q2. The following Java program returns errors. Your task is to identify all the errors/warnings and correct them. Do not write the entire program. You are not allowed to add or remove any 9 marks line from the given program. Your task is to mention the line numbers which are incorrect and then write the required changes in those lines.

```
1  interface IShowAd{
2      public void showAd();
3  }
4
5  class App{
6
7      private String name;
8
9      public App(String name){
10         this.name = name;
11     }
12
13     public int getName(){
14         return name;
15     }
16 }
17
18 class IPhoneApp implements App extends IShowAd {
19     public IPhoneApp(){
20         super.name = "IPhone App";
21     }
22
23     public void showAd(){
24         System.out.println("Showing AD");
25     }
26 }
27
28 class public MyApp {
29
30     public static void main(String[] pos-ARGS) {
31         boolean parsEmptyLine = false;
32         App f = new IPhoneApp();
33         System.out.println(f.getName());
34         if(parsEmptyLine){
35             f.showAd();
36         }
37     }
38 }
```

Q3. Binary trees can be used to represent mathematical formulas. For example, a number (double type) or an operator (+, -, *, /, ^) can be stored as a binary tree and then we can calculate the value of the formula recursively like the following: 9 marks

```
enum NodeTypes { NUMBER, OPERATOR }

class Node {
    NodeTypes type; // Which type of node is this?
    double number; // The value in a node of type NUMBER.
    char operator; // The operation in a node of type OPERATOR.
    Node left; // Pointer to left subtree
    Node right; // Pointer to right subtree

    Node(char operator, Node left, Node right [,]/ Constructor for creating a node of type OPERATOR
        this.type = NodeTypes.OPERATOR;
        this.operator = operator;
        this.left = left;
        this.right = right;
    }

    Node(double number ) [ ,]/ Constructor for creating a node of type NUMBER
        type = NodeTypes.NUMBER;
        this.number = number;
    }
}
```

Given the above class Node, write a recursive method to find the value of a formula tree e.g. 18 in the above tree. Assume that there are only four operators +(plus), -(minus), *(multiplication), and /(division) allowed in the formula.

Q4. Your task is to create a doctor's appointment system. Patients are only allowed to book an appointment with the doctor at 1, 2 or 3 PM. Use an appropriate collection to store patients' 9 marks preferred time slot and their name. Write a loop that iterates as long as there is an empty space in the doctor's schedule.

Assume the patients to enter their preferred time and name. In case the time slot is available, put the time and patients' name into your chosen collection and print "Hi <name>, your appointment is confirmed at <time> PM". Otherwise, print "Slot Not Available, please choose another slot". If the patient enters an invalid time slot, print "Invalid slot, please choose either 1,2, or 3 pm slot".

When all the appointments are made, print the appointment schedule in the following format:

```
Time -> Name
```

Input/Output:

```
Enter Name: Sam
Enter time: 1
Hi Sam, your appointment is confirmed at 1 PM.
Enter Name: Ted
Enter time: 2
Slot Not Available, please choose another slot.
Enter time: 1
Hi Ted, your appointment is confirmed at 1 PM.
Enter Name: Ted
Enter time: 3
Hi Ted, your appointment is confirmed at 3 PM.
Enter time: 1
Slot Not Available, please choose another slot.
Enter time: 2
Hi Ted, your appointment is confirmed at 2 PM.
1 -> Sam
2 -> Ted
3 -> Ted
Enter time: 1
Invalid slot, please choose either 1, 2 or 3 pm slot.
```

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