

0. Multiple-choice. Choose the best answer. (2points/each)

0.1 When your Java program generates error message during compilation, you have to

- 1) return your computer within 30 days of the error occurred.
- 2) call 911.
- 3) rub out the error message with an eraser.
- 4) check and collect your source code.

0.2 The name Java was derived from

- 1) a cup of coffee
- 2) an acronym for JBuilder Activated Variable Assembly
- 3) a dedication to the memory of the people in Java Island
- 4) an acronym for Jackson's Activities for Various Arts

0.3 Java and Java Script are the same programming language.

- 1) True 2) false

0.4 In Java, the name of the class must be the same as the name of the .java file.

- 1) false
- 2) true - but case sensitivity does not apply
- 3) true - but additional numbers may be added to the name
- 4) true

0.5 OOP stands for:

- 1) Observable Object Programming
- 2) Object Observed Procedures
- 3) Object Oriented Programming
- 4) Object Of Programming

0.6 The name of a variable is known as its:

- 1) identifier
- 2) constant
- 3) data type
- 4) base

0.7 What is a class in java?

- 1) A class is a blue print from which individual objects are created. A class can contain fields and methods to describe the behavior of an object.
- 2) class is a special data type.
- 3) class is used to allocate memory to a data type.
- 4) none of the above.

0.8 What output is produced by the following method?

```
public static void main(String[] args) {  
    int a = 10;  
    int b = 3;  
    System.out.println(a + "-" + b);  
}
```

- 1) 7 2) 13 3) 10-3 4) 10+3 5) no output(error)

0.9 What output is produced by the following method?

```
public static void main(String[] args) {  
  
    for (int i=1; i<=2;i++) {  
        int x = i;  
        System.out.println(x+i);  
    }  
    x++;  
    System.out.println(x);  
}
```

- 1) 1 2 2) 2 4 3) 2 4 5 4) 2 4 5) no output(error)
5

0.10 Which of the following is the correct method?

```
public static int ifElse1(int a, int b){  
    if (a >=b) {  
        return a;  
    } else if (a<b) {  
        return b;  
    }  
}
```

```
public static int ifElse2(int a, int b){  
    if (a > b) {  
        return a;  
    } else if (b > a) {  
        return b;  
    } else if (a==b)  
        return a+b;  
}
```

- 1) ifElse1 2) ifElse2 3) ifElse1 and ifElse2 4) none of them

1. Expressions: For each expression, indicate its value. Be sure to list a constant of appropriate type (e.g., 7.0 rather than 7 for a double, Strings in quotes). (2points/each)

"1" + 2 + 3 + "4" 1234

5 * 6 + "7" + (8 + 9) 30717

2+3 * 3-2 % 6 9

200 / 20 + 10 / 5.0 12.0

8 - 2 + "8 - 2" + (8 - 2) 68-26

2. Parameter Mystery: Write the output produced by the following program. (10points)

```
public class ParameterMystery {
    public static void main(String[] args) {
        int x = 1, y = 2, z = 3;
        x = mystery(x, z, y);
        System.out.println(x + " " + y + " " + z);
        z = mystery(z, z, x);
        System.out.println(x + " " + y + " " + z);
    }
    public static int mystery(int z, int x, int y) {
        x++;
        y = 3 * x + z;
        z = x + y;
        System.out.println(y + " " + z);
        return x;
    }
}
```

13 17
4 2 3
15 19
4 2 4

3. If/Else Simulation

3.1 Consider the following method.

```
public static void ifElseMystery(int a, int b) {
    if (a < b * 2) {
        a = a + 2;
        b = b - 3;
    } else if (a == b * 2) {
        a = a * 2;
        b = b + 5;
    } else {
        a = a - 3;
    }
    if (a >= 10 && b >= 10) {
        a = a - 10;
        b = b - 10;
    }
    System.out.println(a + " " + b);
}
```

For each call below, indicate what output is produced. (2points/each)

```
ifElseMystery(2, 5);      4 2
ifElseMystery(5, 2);      2 2
ifElseMystery(-10, 10);   -8 7
```

3.2 The following method contains 3 mistakes. What are they? (4points. No partial credit)

```
public static void main(String[] args) {  
    for (int i=1; i<10; i++); {  
        if (i=3){  
            System.out.println("i is 3");  
        } else if {  
            System.out.println(i);  
        }  
    }  
}
```

4. Loop Simulation

4.1 Consider the following method:

```
public static void mystery(int x) {  
    int y = 1;  
    int z = 2;  
    while (x > z) {  
        if (x % z == 0) {  
            x = x / z;  
            y++;  
        } else {  
            z++;  
        }  
    }  
    System.out.println(y + " " + z);  
}
```

For each call below, indicate what output is produced: (2points/each)

mystery(3);	1 3
mystery(5);	1 5
mystery(7);	1 7

4.2 What output is produced by the following loop? (4points, No partial credit)

for (int i=1; i<=10;i++) {	
System.out.print(i);	
if (i%3==0){	123
System.out.println();	456
}	789
}	10

5. [Student-created Question] (10 Points)

Create a Java program where you enter a question, and it responds with a “yes” or “no” based on string length. If they ask string with less than 10 digits, say “no”. If they ask string with more than 10 digits and less than 50 digits, say “yes”. If they ask string with more than 50 digits, say “cannot think. ask again later”.

```
public class stringLengthYesNo {
    public static void main(String[] args) {
        Scanner console = new Scanner(System.in);

        System.out.print("Please type any string: ");
        String s1 = console.next();
        int sLength=s1.length();
        String result = answer(sLength);
        System.out.println(s1 + " : " + sLength + " "+ result);
    }

    public static String answer(int length){
        if (length < 10) {
            return "no";
        } else if (length >= 10 && length <50) {
            return "yes";
        } else
            return "cannot think. ask again later." ;
    }
}
```

6. Fill in the blank () to complete the method that generates the following output. (5points/each)

```
        $$$$      1
       $$$$$$    2
      $$$$$$$$$$ 3
     $$$$$$$$$$$$ 4
    $$$$$$$$$$$$$$ 5

        public static void main(String[] args) {
            int howMany = 5;
            String s = "$";
            for (int i = 1; i <= howMany; i++) {
                // blank(left side)
                for (int j = 1; j<= howMany*2 - 2*i; j++) {
                    System.out.print(" ");
                }
                // $$
                for (int j = 1; j <= i*4; j++) {
                    System.out.print(s);
                }
                // blank(right side)
                for (int j = 1; j<=howMany*2 - 2*i; j++) {
                    System.out.print(" ");
                }
                // number
                System.out.println(      i      );
            }
        }
```

7. Programming, 30 points. Our solar system consists of an average star we call the Sun, the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. The table below shows all the planets and their **distance to the Sun**.

Planet	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
A.U.	0.387	0.723	1.000	1.524	5.203	9.523	19.208	30.087	39.746

Complete the following Java program. Your program will prompt the user for information about a planet where you are right now (your planet), and two more planets (planet1, planet2) , then computes distance to **your planet** for each planet. To save time in this midterm exam, we use the first 5 planets (from Mercury to Jupiter). The sample log of execution indicates how your program is to behave. After obtaining distance for each planet, the program reports how they compare. As indicated in the sample log of execution, your program is to report the **distance to your planet** for each planet. In addition to reporting the distance for each planet, the program should also produce whichever of the following messages is appropriate:

```
Jupiter seems to be closer than Venus.
Venus seems to be closer than Jupiter.
Jupiter and Venus seem to be equal.
```

We are assuming that all the inputs are integer and valid data. This means that you don't need to check and create error messages. The program runs only one time. This means that you don't need to use "while" statements. However, you should use static methods to eliminate redundant code and to break the problem up into logical subtasks. **You should not use syntax or constructs not covered in this lectures.**

Sample log of execution

```
1.Mercury  2.Venus  3.Earth  4.Mars  5.Jupiter
```

```
Where are you now? 4
Select first Planet: 2
Select second Planet: 5

Venus distance from Mars = 0.801AU
Jupiter distance from Mars = 3.679AU
Venus seems to be closer than Jupiter.
```

```
// your program starts here.
```

```
import java.util.*;
public class Planet {
    public static String p1 = "Mercury"; // planet 1
    public static String p2 = "Venus";
    public static String p3 = "Earth";
    public static String p4 = "Mars";
    public static String p5 = "Jupiter";

    public static double d1 = 0.387; // distance from planet 1 to the Sun
    public static double d2 = 0.723;
    public static double d3 = 1.000;
    public static double d4 = 1.524;
    public static double d5 = 5.203;
```

```

public static void main(String[] args) {
    Scanner console = new Scanner(System.in);
    menu();

    System.out.println("Where are you now?");
    int myPlanet = console.nextInt();
    double myPlanet_distance = getDistance(myPlanet);
    String myPlanet_name = getName(myPlanet);

    System.out.println("Select first planet: ");
    int Planet1 = console.nextInt();
    double Planet1_distance = getDistance(Planet1);
    String Planet1_name = getName(Planet1);

    System.out.println("Select second planet: ");
    int Planet2 = console.nextInt();
    double Planet2_distance = getDistance(Planet2);
    String Planet2_name = getName(Planet2);

    double d01 = Math.abs(myPlanet_distance-Planet1_distance); // dis. from my
to p1
    double d02 = Math.abs(myPlanet_distance-Planet2_distance); // dis. from my
to p2

    System.out.println(Planet1_name + " distance from " + myPlanet_name + " = " +
d01 + "AU");
    System.out.println(Planet2_name + " distance from " + myPlanet_name + " = " +
d02 + "AU");

    if (d01<d02){
        System.out.println(Planet1_name + " seems to be closer than " +
Planet2_name + ".");
    } else if (d01>d02) {
        System.out.println(Planet2_name + " seems to be closer than " +
Planet1_name + ".");
    } else {
        System.out.println(Planet1_name + " and " + Planet2_name + " seem to be
equal.");
    }
}

public static void menu(){
    System.out.println("1.Mercury    2.Venus    3.Earth    4.Mars    5.Jupiter    ");
}

public static double getDistance(int planet){
    double distance=0;
    switch(planet){
        case 1: distance=d1;
            break;
        case 2: distance=d2;
            break;
        case 3: distance=d3;
            break;
        case 4: distance=d4;

```

```

        break;
    case 5: distance=d5;
        break;
    }
    return distance;
}

public static String getName(int planet){
    String name="";
    switch(planet){
        case 1: name=p1;
            break;
        case 2: name=p2;
            break;
        case 3: name=p3;
            break;
        case 4: name=p4;
            break;
        case 5: name=p5;
            break;
    }
    return name;
}
}

```