

## JAVA PROGRAMMING EXERCISE - MARCH 25<sup>th</sup>

### Question 1:

#### Code:

```
import java.util.Scanner;

public class qs1 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Username: ");
        String user = sc.nextLine();
        System.out.print("Enter Password: ");
        String pass = sc.nextLine();
        System.out.print("Confirm Password: ");
        String cnfpass = sc.nextLine();
        if (user.length() < 8) {
            System.out.println("Invalid username length");
        }
        if (pass.length() < 8) {
            System.out.println("Invalid password length");
        }
        if (user.contains(" ") || pass.contains(" ")) {
            System.out.println("Username or Password should not contain spaces.");
        }
        if (pass.equals(cnfpass) != true) {
            System.out.println("Passwords don't match.");
        }
        String temp = "";
        for (int i = 0; i < user.length() - 2; i++) {
            for (int j = i; j < i + 3; j++) {
                temp += user.charAt(j);
            }
            if (pass.contains(temp)) {
                System.out.println("Password cannot contain username ");
                break;
            } else {
```

```
        temp = "";  
    }  
}  
sc.close();  
}  
}
```

**Output:**

```
| ~/Documents/WINSEM20-21/JAVA LAB/DA3 | cd "/home/subham/"  
8 -cp /home/subham/.config/Code/User/workspaceSto  
Enter Username: Subham  
Enter Password: pass  
Confirm Password: pass  
Invalid username length  
Invalid password length  
  
| ~/Documents/WINSEM20-21/JAVA LAB/DA3 | cd "/home/subham/"  
8 -cp /home/subham/.config/Code/User/workspaceSto  
Enter Username: Subham Panda  
Enter Password: pass word  
Confirm Password: pass  
Username or Password should not contain spaces.  
Passwords don't match.
```

**Question 2:**

**Code:**

```
import java.util.*;

public class qs2 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Scanner sc1 = new Scanner(System.in);
        System.out.println("Enter number of students: ");
        int n = sc1.nextInt();
        student st[] = new student[n];
        for (int i = 0; i < st.length; i++) {
            String name;
            String regno;
            String phone;
            st[i] = new student();
            System.out.println("Input Details of Student " + (i + 1));
            System.out.print("Enter Name: ");
            name = sc.nextLine();
            System.out.print("Enter Reg number: ");
            regno = sc.nextLine();
            System.out.print("Enter Phone: ");
            phone = sc.nextLine();
            st[i].getinfo(name, regno, phone);
            System.out.println();
        }
        student.sortobj(st);
        sc.close();
        sc1.close();
    }
}

class student {
    String Name;
    String Regno;
    String Phone;

    void getinfo(String Name, String Regno, String Phone) {
```

```
        this.Name=Name;
        this.Regno=Regno;
        this.Phone=Phone;
    }

    public void displayinfo() {
        System.out.println(Name + " " + Regno + " " + Phone);
        System.out.println();
    }

    public static void sortobj(student s[]) {
        for (int i = 0; i < s.length - 1; i++) {
            for (int j = 0; j < s.length - 1 - i; j++) {
                if (s[j].Name.compareTo(s[j + 1].Name) > 0) {
                    student temp = new student();
                    temp = s[j];
                    s[j] = s[j + 1];
                    s[j + 1] = temp;
                }
            }
        }
        for (int i = 0; i < s.length; i++) {
            s[i].displayinfo();
        }
    }
}
```

Output:

```
~/Documents/WINSEM20-21/JAVA LAB/DA3
8 -cp /home/subham/.config/Code/User/workspac
Enter number of students:
3
Input Details of Student 1
Enter Name: Subham Panda
Enter Reg number: 19BIT0093
Enter Phone: 9658965896

Input Details of Student 2
Enter Name: Rohin Goyal
Enter Reg number: 19BIT0140
Enter Phone: 8524695632

Input Details of Student 3
Enter Name: Aditya
Enter Reg number: 19BIT0139
Enter Phone: 9658236512

Aditya 19BIT0139 9658236512

Rohin Goyal 19BIT0140 8524695632

Subham Panda 19BIT0093 9658965896
```

**Question 3:**

**Code:**

```
import java.util.Scanner;

public class qs3 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        dependent a[] = new dependent[4];
        System.out.println("---ENTER DETAILS OF PROFESSOR---");
        a[0] = new professor();
        System.out.println("---ENTER DETAILS OF ASSOCIATE PROFESSOR---");
        a[1] = new associateProfessor();
        System.out.println("---ENTER DETAILS OF ASSISTANT PROFESSOR---");
        a[2] = new assistantProfessor();
        System.out.println("---ENTER DETAILS OF TRA---");
        a[3] = new TRA();
        System.out.print("Enter the employee id to search: ");
        String id = sc.nextLine();
        dependent.findEmployee(a, id);
        sc.close();
    }
}

class dependent {
    String empid;
    String name;
    String phoneno;
    String dob;
    double sal;

    dependent() {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter employee id: ");
        empid = sc.nextLine();
        System.out.print("Enter name: ");
        name = sc.nextLine();
        System.out.print("Enter phone number: ");
        phoneno = sc.nextLine();
        System.out.print("Enter date of birth: ");
```

```
        dob = sc.nextLine();
        // sc.close();
    }

    public void displayDetails() {
        System.out.println(empid + " " + name + " " + phoneno + " " + dob +
" " + sal);
    }

    public static void findEmployee(dependent x[], String id) {
        int flag = 0;
        for (int i = 0; i < x.length; i++) {
            if (x[i].empid.equals(id)) {
                x[i].displayDetails();
                flag = 1;
                break;
            }
        }
        if (flag == 0) {
            System.out.println("EMPLOYEE NOT FOUND");
        }
    }
}

class professor extends dependent {
    professor() {
        super();
        sal = 150000 + (0.3 * 150000);
    }
}

class associateProfessor extends dependent {
    associateProfessor() {
        super();
        sal = 120000 + (0.2 * 120000);
    }
}
```

```
class assistantProfessor extends dependent {
    assistantProfessor() {
        super();
        sal = 100000 + (0.1 * 100000);
    }
}

class TRA extends dependent {
    TRA() {
        super();
        sal = 20000;
    }
}
```

### Output:

```
~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/su
8 -cp /home/subham/.config/Code/User/workspaceStorage/d
---ENTER DETAILS OF PROFESSOR---
Enter employee id: 101
Enter name: Subham
Enter phone number: 9658569856
Enter date of birth: 10/03/2001
---ENTER DETAILS OF ASSOCIATE PROFESSOR---
Enter employee id: 102
Enter name: Rohin
Enter phone number: 9652365214
Enter date of birth: 25/11/1999
---ENTER DETAILS OF ASSISTANT PROFESSOR---
Enter employee id: 103
Enter name: Arnab
Enter phone number: 9865236251
Enter date of birth: 12/01/2000
---ENTER DETAILS OF TRA---
Enter employee id: 104
Enter name: Shresth
Enter phone number: 9865236523
Enter date of birth: 29/11/2000
Enter the employee id to search: 104
104 Shresth 9865236523 29/11/2000 20000.0
```



**Question 4:**

**Code:**

```
import java.lang.Math;
import java.util.Scanner;

public class qs4 {
    public static void main(String[] args) {
        int x,y,z;
        Scanner sc = new Scanner(System.in);
        shape s[] = new shape[4];
        s[0] = new square();
        System.out.print("Enter x coordinate for square: ");
        x = sc.nextInt();
        System.out.print("Enter y coordinate for square: ");
        y = sc.nextInt();
        s[0].getlocation(x, y);
        s[0].computearea();
        s[1] = new circle();
        System.out.print("Enter x coordinate for circle: ");
        x = sc.nextInt();
        System.out.print("Enter y coordinate for circle: ");
        y = sc.nextInt();
        s[1].getlocation(x, y);
        s[1].computearea();
        s[2] = new sphere();
        System.out.print("Enter x coordinate for sphere: ");
        x = sc.nextInt();
        System.out.print("Enter y coordinate for sphere: ");
        y = sc.nextInt();
        System.out.print("Enter z coordinate for sphere: ");
        z = sc.nextInt();
        s[2].getlocation(x, y, z);
        s[2].computearea();
        s[3] = new cube();
        System.out.print("Enter x coordinate for cube: ");
        x = sc.nextInt();
        System.out.print("Enter y coordinate for cube: ");
        y = sc.nextInt();
```

```
        System.out.print("Enter z coordinate for cube: ");
        z = sc.nextInt();
        s[3].getlocation(x, y, z);
        s[3].computearea();
        sc.close();
    }
}

abstract class shape {
    double area;
    int x;
    int y;
    int z;
    double positionVector;

    public void getlocation(int x, int y, int z) {
        this.x = x;
        this.y = y;
        this.z = z;
        positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2) +
Math.pow(z, 2));
    }

    public void getlocation(int x, int y) {
        this.x = x;
        this.y = y;
        positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2));
    }

    public void display() {
        System.out.println(area);
    }

    public abstract void computearea();
}

abstract class twodimensionalshape extends shape {
    int x;
```

```
int y;
double positionVector;

public void getlocation(int x, int y) {
    this.x = x;
    this.y = y;
    positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2));
}
}

abstract class threedimensionalshape extends shape {
    int x;
    int y;
    int z;
    double positionVector;

    public void getlocation(int x, int y, int z) {
        this.x = x;
        this.y = y;
        this.z = z;
        positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2) +
Math.pow(z, 2));
    }
}

class circle extends twodimensionalshape {
    @Override
    public void computearea() {
        area = 3.14 * positionVector * positionVector;
        super.display();
    }
}

class square extends twodimensionalshape {
    @Override
    public void computearea() {
        area = positionVector * positionVector;
        super.display();
    }
}
```

```
}

class sphere extends threedimensionalshape {
    @Override
    public void computearea() {
        area = 4 * 3.14 * positionVector * positionVector;
        super.display();
    }
}

class cube extends threedimensionalshape {
    @Override
    public void computearea() {
        area = 6 * positionVector * positionVector;
        super.display();
    }
}
```

### Output:

```
~/Documents/WINSEM20-21/JAVA LAB/DA
8 -cp /home/subham/.config/Code/User/w
Enter x coordinate for square: 5
Enter y coordinate for square: 5
50.000000000000001
Enter x coordinate for circle: 3
Enter y coordinate for circle: 3
56.519999999999996
Enter x coordinate for sphere: 4
Enter y coordinate for sphere: 4
Enter z coordinate for sphere: 4
602.8799999999999
Enter x coordinate for cube: 2
Enter y coordinate for cube: 5
Enter z coordinate for cube: 6
389.99999999999994
```

**Question 5:**

**Code:**

```
//qs 4

public class javalabclass {
    public static void main(String[] args) {
        professor satish = new professor("satish ", "vellore ", "111 ",
"a06");
        satish.display_professor();
    }
}

abstract class person {
    protected String name;
    protected String address;

    public abstract void display_vitadd();
}

class faculty extends person {
    public String empid;

    public faculty(String a, String b, String c) {
        name = a;
        address = b;
        empid = c;
    }

    public void display_faculty() {
        System.out.println(name + address + empid);
    }

    @Override
    public void display_vitadd() {
        System.out.println(address);
    }
}
```

```
class professor extends faculty {  
    public String cabinno;  
  
    public professor(String a, String b, String c, String d) {  
        super(a, b, c);  
        cabinno = d;  
    }  
  
    public void display_professor() {  
        System.out.println(name + address + empid + cabinno);  
    }  
}
```

**Output:**

```
| | ~/Documents/WINSEM20-21/JAVA LAB/DA3 /  
d429f51822d652a477b9d1ffc65168b/redhat.java/  
satish vellore 111 a06
```

**Question 6:**

**Code (Arithmetic Exception):**

```
import java.util.Scanner;

public class qs6ArithmeticException {
    public static void main(String[] args) {
        int a, b;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter first number: ");
        a = sc.nextInt();
        System.out.print("Enter second number: ");
        b = sc.nextInt();
        int c = a / b;
        System.out.println(c);
        sc.close();
    }
}
```

**Output (Arithmetic Exception):**

```
~/.Documents/WINSEM20-21/JAVA LAB/DA3 cd "/home/subham/Documents/W
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a47
Enter first number: 5
Enter second number: 0
Exception in thread "main" java.lang.ArithmeticException: / by zero
    at qs6ArithmeticException.main(qs6ArithmeticException.java:11)
```

**Code (Input Mismatch Exception):**

```
import java.util.Scanner;

public class qs6InputmismatchException {
    public static void main(String[] args) {
        int a;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a number: ");
        a = sc.nextInt();
        System.out.println(a);
        sc.close();
    }
}
```

```
}
```

### Output (Input Mismatch Exception):

```
~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/subham/Documents/WINSEM20-21/JAVA LAB/DA3" ; /usr/bin/javac -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a477b9d1ffc65168b/redhat.java/jd
Enter a number:
Subham
Exception in thread "main" java.util.InputMismatchException
    at java.base/java.util.Scanner.throwFor(Scanner.java:939)
    at java.base/java.util.Scanner.next(Scanner.java:1594)
    at java.base/java.util.Scanner.nextInt(Scanner.java:2258)
    at java.base/java.util.Scanner.nextInt(Scanner.java:2212)
    at qs6InputMismatchException.main(qs6InputMismatchException.java:8)
```

### Code (Null Pointer Exception):

```
public class qs6NullPointerException {
    public static void main(String[] args) {
        demo d = new demo("Subham");
        d = null;
        System.out.println(d.s);
    }
}

class demo {
    String s;

    demo(String s) {
        this.s = s;
    }
}
```

### Output (Null Pointer Exception):

```
~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/subham/Documents/WINSEM20-21/JAVA LAB/DA3" ; /usr/bin/javac -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a477b9d1ffc65168b/redhat.java/jd
Exception in thread "main" java.lang.NullPointerException: Cannot read field "s" because "d" is null
    at qs6NullPointerException.main(qs6NullPointerException.java:5)
```



**Code (Array Out of Bounds Exception):**

```
public class qs6ArrayIndexOutOfBoundsException {  
    public static void main(String[] args) {  
        int a[] = {1,2,3,4,5};  
        System.out.println(a[6]);  
    }  
}
```

**Output (Array Out of Bounds Exception):**

```
~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/subham/Documents/WINSEM20-21/JAVA LAB/DA3" ; /usr/bin/e  
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a477b9d1ffc65168b/redhat.java/jdt_ws/DA  
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: Index 6 out of bounds for length 5  
    at qs6ArrayIndexOutOfBoundsException.main(qs6ArrayIndexOutOfBoundsException.java:4)
```

### Question 7:

#### Code (Arithmetic Exception):

```
import java.util.Scanner;

public class qs7ArithmeticException {
    public static void main(String[] args) {
        try {
            int a, b;
            Scanner sc = new Scanner(System.in);
            System.out.print("Enter first number: ");
            a = sc.nextInt();
            System.out.print("Enter second number: ");
            b = sc.nextInt();
            int c = a / b;
            System.out.println(c);
            sc.close();
        } catch (ArithmeticException e) {
            System.out.println("Cannot divide with 0. Please enter a number other than 0");
        }
    }
}
```

#### Output (Arithmetic Exception):

```
~/.Documents/WINSEM20-21/JAVA LAB/DA3 cd "/home/subham/
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f
Enter first number: 5
Enter second number: 0
Cannot divide with 0. Please enter a number other than 0
```

#### Code (Input Mismatch Exception):

```
import java.util.InputMismatchException;
import java.util.Scanner;

public class qs7InputMismatchException {
    public static void main(String[] args) {
```

```
    try {
        int a;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a number: ");
        a = sc.nextInt();
        System.out.println(a);
        sc.close();
    } catch (InputMismatchException e) {
        System.out.println("You need to enter a number. Not any other
type");
    }

}
```

#### Output (Input MismatchArithmetic Exception):

```
|| ~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/
8 -cp /home/subham/.config/Code/User/workspaceStorage
Enter a number:
Subham
You need to enter a number. Not any other type
```

#### Code (Null Pointer Exception):

```
public class qs7NullPointerException {
    public static void main(String[] args) {
        try {
            demo1 d = new demo1("Subham");
            d = null;
            System.out.println(d.s);
        } catch (NullPointerException e) {
            System.out.println("The varaiable d doesnt reference to any
memory, so cant access the variable");
        }

    }
}

class demo1 {
    String s;
```

```
demo1(String s) {  
    this.s = s;  
}  
}
```

### Output (Null Pointer Exception):

```
~/Documents/WINSEM20-21/JAVA LAB/DA3 cd "/home/subham/Documents/WINSEM20  
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a477b9d1f  
The variable d doesnt reference to any memory, so cant access the variable
```

### Code (Array Out Of Bounds Exception):

```
public class qs7ArrayIndexOutOfBoundsException {  
    public static void main(String[] args) {  
        try {  
            int a[] = { 1, 2, 3, 4, 5 };  
            System.out.println(a[6]);  
        } catch (ArrayIndexOutOfBoundsException e) {  
            System.out.println("The array length is 5, cant access an  
element more than index 4");  
        }  
    }  
}
```

### Output (Array Out Of Bounds Exception):

```
~/Documents/WINSEM20-21/JAVA LAB/DA3 cd "/home/subham/Docum  
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822  
The array length is 5, cant access an element more than index 4
```