JAVA PROGRAMMING EXERCISE - MARCH 25th

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 "/h
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 "/h
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/workspa
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
50.00000000000001
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):

```java
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/WI
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):

```java
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/WINSEM20-2
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a477b9d1ffc
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" ; /us
8 -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):

```java
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 varaiable 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
```

JAVA PROGRAMMING EXERCISE - APRIL 1st

Question 1:

Code:

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

public class qs1 {
   public static void main(String[] args) {
       Scanner sc = new Scanner(System.in);
       try {
           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 = "";
                }
            }
        } catch (InputMismatchException e) {
            System.out.println("Please enter the correct input!");
        } catch (Exception e) {
            System.out.println("Sorry for the inconvinience caused!");
            System.out.println(e.getMessage());
        } finally {
            sc.close();

        }

    }
}
```

Output:

```
~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/h
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 "/h
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);
       try {
           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);
       } catch (InputMismatchException e) {
           System.out.println("Please enter the correct input!");
       } catch (NullPointerException e) {
           System.out.println("The object you are trying to reference
doesnt point to any location in memory");
       } catch (Exception e) {
           System.out.println("Sorry for the inconvinience caused!");
           System.out.println(e.getMessage());
       } finally {
           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[]) {
        try {
            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();
            }
        } catch (ArithmeticException e) {
```

```
            System.out.println("Arithmetic Exception occured during Sorting
the Array of student objects");
        } catch (NullPointerException e) {
            System.out.println("NullPointer Exception occured during
Sorting the Array of student objects");
        } catch (Exception e) {
            System.out.println("Some Error occured while sorting the array
of student objects");
            System.out.println(e.getMessage());
        }

    }
}
```

Output:

```
~/Documents/WINSEM20-21/JAVA LAB/DA3
8 -cp /home/subham/.config/Code/User/workspa
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.*;

public class qs3 {
   public static void main(String[] args) {
       Scanner sc = new Scanner(System.in);
       try {
           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);
       } catch (InputMismatchException e) {
           System.out.println("Please enter the correct input!");
       } catch (ArithmeticException e) {
           System.out.println("Arithmetic Exception occurred!");
       } catch (NullPointerException e) {
           System.out.println("The object you are trying to reference
doesnt point to any location in memory");
       } catch (ArrayIndexOutOfBoundsException e) {
           System.out.println("You are trying to access an index which is
larger than the array");
       } catch (Exception e) {
           System.out.println("Sorry for the inconvenience caused!");
           System.out.println(e.getMessage());
       } finally {
           sc.close();
       }
```

```
    }
}

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

    dependent() {
        try {
            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();
        } catch (InputMismatchException e) {
            System.out.println("Please enter the correct input!");
        } catch (Exception e) {
            System.out.println("Sorry for the inconvinience caused!");
            System.out.println(e.getMessage());
        }

        // sc.close();
    }

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

    public static void findEmployee(dependent x[], String id) {
        try {
```

```
            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");
            }
        } catch (NullPointerException e) {
            System.out.println("The object you are trying to reference
doesnt point to any location in memory");
        } catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("You are tryng to access an index which is
larger than the array");
        } catch (Exception e) {
            System.out.println("Sorry for the inconvinience caused!");
            System.out.println(e.getMessage());
        }
    }
}

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.*;

public class qs4 {
   public static void main(String[] args) {
       int x, y, z;
       Scanner sc = new Scanner(System.in);
       try {
           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();
        } catch (InputMismatchException e) {
            System.out.println("Please enter the correct input!");
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred!");
        } catch (NullPointerException e) {
            System.out.println("The object you are trying to reference
doesnt point to any location in memory");
        } catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("You are tryng to access an index which is
larger than the array");
        } catch (Exception e) {
            System.out.println("Sorry for the inconvinience caused!");
            System.out.println(e.getMessage());
        } finally {
            sc.close();
        }

    }
}

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

    public void getlocation(int x, int y, int z) {
        try {
            this.x = x;
            this.y = y;
```

```
            this.z = z;
            positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2) +
Math.pow(z, 2));
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calcualting position vector!");
        } catch (Exception e) {
            System.out.println("Error occured during initializing
location!");
            System.out.println(e.getMessage());
        }

    }

    public void getlocation(int x, int y) {
        try {
            this.x = x;
            this.y = y;
            positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2));
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calcualting position vector!");
        } catch (Exception e) {
            System.out.println("Error occured during initializing
location!");
            System.out.println(e.getMessage());
        }

    }

    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) {
        try {
            this.x = x;
            this.y = y;
            positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2));
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calcualting position vector!");
        } catch (Exception e) {
            System.out.println("Error occured during initializing
location!");
            System.out.println(e.getMessage());
        }

    }
}

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

    public void getlocation(int x, int y, int z) {
        try {
            this.x = x;
            this.y = y;
            this.z = z;
            positionVector = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2) +
Math.pow(z, 2));
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calcualting position vector!");
        } catch (Exception e) {
            System.out.println("Error occured during initializing
location!");
```

```
            System.out.println(e.getMessage());
        }

    }
}

class circle extends twodimensionalshape {

    @Override
    public void computearea() {
        try {
            area = 3.14 * positionVector * positionVector;
            super.display();
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calculating circle area!");
        } catch (Exception e) {
            System.out.println("Error occured during calculating circle
area!");
            System.out.println(e.getMessage());
        }

    }
}

class square extends twodimensionalshape {
    @Override
    public void computearea() {
        try {
            area = positionVector * positionVector;
            super.display();
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calculating square area!");
        } catch (Exception e) {
            System.out.println("Error occured during calculating square
area!");
            System.out.println(e.getMessage());
        }
```

```
    }
}

class sphere extends threedimensionalshape {
    @Override
    public void computearea() {
        try {
            area = 4 * 3.14 * positionVector * positionVector;
            super.display();
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calculating sphere surface area!");
        } catch (Exception e) {
            System.out.println("Error occured during calculating sphere
surface area!");
            System.out.println(e.getMessage());
        }

    }
}

class cube extends threedimensionalshape {
    @Override
    public void computearea() {
        try {
            area = 6 * positionVector * positionVector;
            super.display();
        } catch (ArithmeticException e) {
            System.out.println("Arithmetic Exception occurred during
calculating cube surface area!");
        } catch (Exception e) {
            System.out.println("Error occured during calculating cube
surface area!");
            System.out.println(e.getMessage());
        }

    }
}
```

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
50.00000000000001
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
```

```
~/Documents/WINSEM20-21/JAVA LAB/DA3
8 -cp /home/subham/.config/Code/User/works
Enter x coordinate for square: hello
Please enter the correct input!
```

Question 5:

Code:

```
import java.util.*;

public class qs5 {
   public static void main(String[] args) {
       Scanner sc = new Scanner(System.in);
       try {
           System.out.print("Enter the number of students whose mark you
want to enter: ");
           int n = sc.nextInt();
           int[] marks = new int[n];
           for (int i = 0; i < marks.length; i++) {
               System.out.print("Enter the marks of student " + (i + 1) +
": ");
               marks[i] = sc.nextInt();
               if (marks[i] < 0) {
                   throw new marksNotInRangeException("Marks cannot be
less than 0");
               } else if (marks[i] > 100) {
                   throw new marksNotInRangeException("Marks cannot be
greater than 100");
               }
           }
       } catch (InputMismatchException e) {
           System.out.println("Input type for mark should be a number
only");
       } catch (marksNotInRangeException e) {
           System.out.println(e.getMessage());
       } catch (Exception e) {
           System.out.println(e.getMessage());
       } finally {
           sc.close();
       }
   }
```

```
}

class marksNotInRangeException extends Exception {
   marksNotInRangeException(String s) {
        super(s);
   }
}
```

Output:

```
~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/subham/Documents/W
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a4
Enter the number of students whose mark you want to enter: 4
Enter the marks of student 1: 6
Enter the marks of student 2: -7
Marks cannot be less than 0

~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/subham/Documents/W
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a4
Enter the number of students whose mark you want to enter: 5
Enter the marks of student 1: 55
Enter the marks of student 2: 105
Marks cannot be greater than 100

~/Documents/WINSEM20-21/JAVA LAB/DA3  cd "/home/subham/Documents/W
8 -cp /home/subham/.config/Code/User/workspaceStorage/dd429f51822d652a4
Enter the number of students whose mark you want to enter: hello
Input type for mark should be a number only
```