1. Read the following details from the user
   - Username
   - Password
   - Confirm Password.

   Write a Java Program and perform the following checks on the input data using String methods.
   a) If the username or password is less than 8 characters in length then display Invalid username length or Invalid Password length to the user.
   b) If the username or password contains a space then display Username or Password should not contain spaces.
   c) If the password does not match confirm password then display Passwords don't match to the user.
   d) If any three adjacent characters of the username in the same order is part of the password then display password cannot contain username message to the user.

2. Consider a class by name Student containing the following

   Class Instance Variables

   - Name – type String
   - Regno – type String
   - Phone - type String

   Methods

   - getInfo – Method receives the name, regno, phone details for a student using its input parameters and assigns it to the class instance variables .
   - displayinfo - Displays all the data from the class instance variables to the user.
   - **static** sortobj – This method receives an array of student objects. It sorts the array of objects in the ascending order using the name field and displays all details of each student object in the sorted order.

   Write a Java program that creates the student class and instantiates an array of student objects. The details of the student objects in the sorted order should be displayed by using the sortobj method of the student class.

3. A university has faculty members with different designations as mentioned below

   - Professors
   - Associate Professors
   - Assistant Professors.
   - Teaching Research Assistants

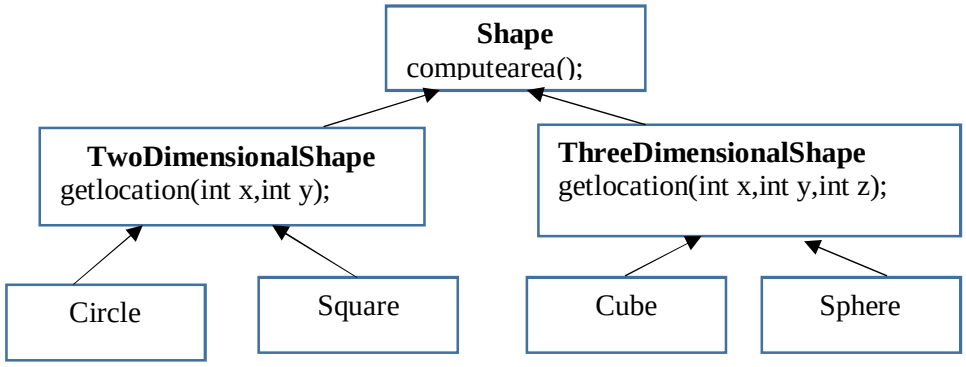
   The salary computation for each designation is decided as follows

   - Professors- Salary is basic Pay(150000) + 30% of Basic pay as DA
   - Associate Professors – Salary is basic pay(120000) + 20% of Basic Pay as DA
   - Assistant Professors – Salary is basic pay(100000) + 10% of Basic Pay as DA

- Teaching Research Assistants (TRA) are appointed on a contract basis and are paid a fixed monthly salary of 20000.

Every faculty member (Except TRA's) has a dependent member (dependent class has a **composition relationship** with faculty) added to the system. The dependent details like dependent name, dependent phone number, dependent date of birth is registered while adding an employee to the system. Design a class diagram and implement a Java application that will display the employee salary and dependent details for an employee upon receiving the employee id.

4.



Shape, TwoDimensionalShape and ThreeDimensionalShape are abstract classes with abstract methods. Create a Java program that uses an array of Shape references to objects of each concrete class in the hierarchy. Also, in the loop that processes all the shapes in the array, determine whether each shape is a two dimensional shape or a three dimensional shape. If the shape is a two dimensional shape then display its area. If the shape is a three dimensional shape then display its surface area. [Surface Area of Cube is $6a^2$ where a is a side of the cube. Surface Area of Sphere is $4\pi r^2$ where r is the radius.]. Apply the concepts of **Dynamic Polymorphism** to achieve the results.

5. Identify the issues with the given code and rewrite the code such that the details of the professor is displayed by the display_professor() method

```
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 void display_faculty() {
      System.out.println(name+address+empid);
 }
}
class professor extends faculty extends person
{
 public String cabinno;

 public void display_professor() {
      System.out.println(name+address+empid+cabinno);
 }
}
```

6. Write Code to and create the following exceptions

- ArithmeticException
- Inputmismatch Exception
- NullpointerException
- ArrayIndexOutofBoundsException

7. Write code and handle all the exceptions given in the previous question using try, catch and throw.