CISC 3115 Test-2

Please complete the test and submit it as a plain text email with the subject "CISC 3115 Test2" to nzhou@brooklyn.cuny.edu by midnight on Monday, November 23.

Question 1

Does each of the following programs compile and run? If no, explain the reason; otherwise, give the output.

1. class P1 {
   public static void main(String[] args) {
      A b = new B();
      B a = b;
      a.show();
      b.show();
   }
}

class A {
   public String str = "A";
   public void show() {
      System.out.println(str);
   }
}

class B extends A {
   public String str = "B";
   public void show() {
      System.out.println(str);
   }
}
2. class P2 {
    public static void main(String[] args) {
        A o = new B();
        o.m();
    }
}

class A {
    char x = 'a';

    public char getX() {
        return x;
    }

    public void m() {
        System.out.println(getX());
    }
}

class B extends A {
    char x = 'b';

    public void m() {
        System.out.println(getX());
    }
}
import java.util.*;

class P3 {
    ArrayList<Object> lst;

    public void add(Object obj){
        if (!lst.contains(obj))
            lst.add(obj);
    }
}

public static void main(String[] args){
    P3 d = new P3();
    d.add(1);
    d.add(1);
    d.add(2);
    d.add(2);
}

4. class P4 implements I {
    public int m(int x){
        return x*x;
    }
}

interface I {
    int x, y;

    int m(int x);
}
5. import java.util.Scanner;

class P5 {
    public static void main(String[] args) {
        Scanner input = new Scanner("abc 123");
        try {
            int i = input.nextInt();
        } catch(Exception ex) {
            System.out.println("A");
        }
        finally {
            System.out.println("B");
        }
    }
}
Question 2:

Write a class named `Pentagon` that extends `GeometricObject` and has the following specification. Assume all five sides of the pentagon are of equal size.

```java
public class Pentagon extends GeometricObject {
    private double side;

    /** Construct a Pentagon with the specified side */
    public Pentagon(double side) {
    }

    /** Implement the abstract method findArea in GeometricObject */
    public double findArea() {
    }

    /** Implement the abstract method findPerimeter in GeometricObject */
    public double findPerimeter() {
    }

    /** Override the toString method in the super class such that it concatenates
     * the side, perimeter, and area to the string returned by the toString() method of the super class */
    @Override
    public String toString() {
    }
}
```
Question 3:

Implement a class named `MyIntegerArrayList` that extends the `ArrayList<Integer>` with the following methods:

- public void addFirst(Integer elm)
  This method inserts the element `elm` at the beginning of the list.

- public boolean exists(Integer elm)
  This method returns `true` if `elm` occurs in the list and `false` otherwise.

- public Integer mode()
  This method returns the mode, i.e., the most frequently occurring element, of the list. For example, if the list is `[1, 3, 1, 3, 2, 1]`, then the mode is 1. If there are multiple most frequent elements, then the method can return any one of them.
Question 4:

Suppose that a text file contains an unspecified number of English words separated by blank spaces. Write a program that prompts the user to enter the file name, reads the words from the file, and displays the words in alphabetical order. For example, for a file that contains

ask not what your country can do for you ask what you can do for your country

your program should output

ask
can
country
do
for
not
what
you
your