44-542 Object Oriented Programming

Exam 2 Part 2 A (50 pts total)

1. (6 pts) Assume myWords is an ArrayList of Strings that contains at least three elements. Write only the code necessary to insert the word "hello" between the first and second elements in the list. For example, if the original list is "hi", "bye", "farewell", then the revised list must be "hi", "hello", "bye", "farewell".

myWords.add(1, "hello");

2. (10 pts) Assume we have an ArrayList of integers named myNums. Write only the code necessary to compute and print the sum of the first and the last elements in the list. For example, if the list is 2, 9, 4, 5, 6, then the code must print the value 8.

System.out.println(myNums.get(0) + myNums.get(myNums.size() - 1));

3. (6 pts) Write the Javadoc comments that should precede the method shown below.

public int timesTwo(int x)

{

return 2 \* x;

}

/\*\*

\* Multiplies its argument by 2.

\* @param x The number to double

\* @return x multiplied by 2

\*/

4. (8 pts) When there is an attempt to divide by 0 in a Java program, an ArithmeticException is thrown. Assume a, b, c, and d are variables of type int. Find the output of this code for each case below:

OUTPUT for (a)

A

d = 5

try

{

System.out.println("A");

d = 10 / a;

}

catch (ArithmeticException e1)

{

try

{

System.out.println("B");

d = 10 / b;

OUTPUT for (b)

A

B

d = 3

}

catch (ArithmeticException e2)

{

try

{

System.out.println("C");

d = 10 / c;

}

catch (ArithmeticException e3)

{

OUTPUT for (c)

A

d = 5

System.out.println("D");

d = 10;

}

}

}

System.out.println("d = " + d);

(a) a = 2, b = 3, c = 4

(b) a = 0, b = 3, c = 4

OUTPUT for (d)

A

B

C

D

d = 10

(c) a = 2, b = 0, c = 0

(d) a = 0, b = 0, c = 0

5. (5 pts) The code below defines a class Dog and partially defines a subclass ShowDog of Dog. Complete the code for class ShowDog as follows:

(a) Complete the header line for the class.

(b) Write the body of the constructor.

public class Dog

{

private String name;

private int age;

public Dog(String name, int age)

{

this.name = name;

this.age = age;

}

@Override

public String toString()

{

return name + " " + age;

}

}

public class ShowDog \_\_\_\_\_\_extends Dog\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

{

private int pointsEarned;

public ShowDog(String name, int age, int pointsEarned)

{

// Write body of constructor

super(name, age);

this.pointsEarned = pointsEarned;

}

}

6. (5 pts) Write the UML representation of the Dog class defined in Problem 5.

|  |
| --- |
| **Dog** |
| -name:String  -age:int |
| +Dog(name:String, age:int)  +toString():String |

7. (10 pts) Suppose we have the class hierarchy diagram shown here. There are two interfaces. **AbstractStudent** is an abstract class. All other classes are concrete.



Indicate if the following Java statements are legal or illegal by circling the correct answer in each case.

(a) Person prof = new Professor();

LEGAL ILLEGAL

(b) TeachingAssistant ta = new Employee();

LEGAL ILLEGAL

(c) Undergraduate ug = new TeachingAssistant();

LEGAL ILLEGAL

(d) Employee emp = new Employee();

LEGAL ILLEGAL

(e) AbstractStudent abs = new Graduate();

LEGAL ILLEGAL