Beni-Suef University

Faculty of Computers and Artificial Intelligence

First Term 2021/2022

CS 241 - Object Oriented Programming

SHEET #6

1. Which of the following classes defines a legal abstract class?

```
class A {
  abstract void unfinished() {
  }
}
```

(a)

```
public class abstract A {
  abstract void unfinished();
}
```

(b)

```
class A {
  abstract void unfinished();
}
```

(c)

```
abstract class A {
  protected void unfinished();
}
```

(d)

```
abstract class A {
  abstract void unfinished();
}
```

(e)

```
abstract class A {
  abstract int unfinished();
}
```

(f)

2. True or false?

a. An abstract class can be used just like a nonabstract class except that you cannot use the new operator to create an instance from the abstract class.
b. An abstract class can be extended.
c. A subclass of a nonabstract superclass cannot be abstract.
d. A subclass cannot override a concrete method in a superclass to define it as abstract.
e. An abstract method must be nonstatic.

3. Which of the following is a correct interface?

```
interface A {
  void print() { }
}
```

(a)

```
abstract interface A {
  abstract void print() { }
}
```

(b)

```
abstract interface A {
  print();
}
```

(c)

```
interface A {
  void print();
}
```

(d)

```
interface A {
  default void print() {
  }
}
```

(e)

```
interface A {
  static int get() {
    return 0;
  }
}
```

(f)

4. Modify the Shape class to implement the Comparable interface and define a static max method in the Shape class for finding the larger of two Shape objects. Draw the UML diagram and implement the new Shape class. Write a test program that uses the max method to find the larger of two circles, the larger of two rectangles.

5. Write the following method that averages an ArrayList of integers:

   public static void average(ArrayList list)

6. How can you do the following?

a. Create an `ArrayList` for storing double values?
b. Append an object to a list?
c. Insert an object at the beginning of a list?
d. Find the number of objects in a list?
e. Remove a given object from a list?
f. Remove the last object from a list?
g. Check whether a given object is in a list?
h. Retrieve an object at a specified index from a list?

7. Identify the errors in the following code.

```
ArrayList<String> list = new ArrayList<>();
list.add("Denver");
list.add("Austin");
list.add(new java.util.Date());
String city = list.get(0);
list.set(3, "Dallas");
System.out.println(list.get(3));
```

8. What is the output of the following code?

```
ArrayList<Integer> list = new ArrayList<>();
list.add(1);
list.add(2);
list.add(3);
list.remove(1);
System.out.println(list);
```

How do you remove integer value 3 from the list?

9.

Can each of the following statements be compiled?

a. `Integer i = new Integer("23");`

b. `Integer i = new Integer(23);`

c. `Integer i = Integer.valueOf("23");`

d. `Integer i = Integer.parseInt("23", 8);`

e. `Double d = new Double();`

f. `Double d = Double.valueOf("23.45");`

g. `int i = (Integer.valueOf("23")).intValue();`

h. `double d = (Double.valueOf("23.4")).doubleValue();`

i. `int i = (Double.valueOf("23.4")).intValue();`

j. `String s = (Double.valueOf("23.4")).toString();`

10.

Show the output of the following code:

```
public class Test {
  public static void main(String[] args) {
    Integer x = new Integer(3);
    System.out.println(x.intValue());
    System.out.println(x.compareTo(new Integer(4)));
  }
}
```

11.

Suppose s1, s2, s3, and s4 are four strings, given as follows:

```
String s1 = "Welcome to Java";
String s2 = s1;
String s3 = new String("Welcome to Java");
String s4 = "Welcome to Java";
```

What are the results of the following expressions?

```
a. s1 == s2
b. s1 == s3
c. s1 == s4
d. s1.equals(s3)
e. s1.equals(s4)
f. "Welcome to Java".replace("Java", "HTML")
g. s1.replace('o', 'T')
h. s1.replaceAll("o", "T")
i. s1.replaceFirst("o", "T")
j. s1.toCharArray()
```

12. Let s1 be "Welcome" and s2 be "welcome". Write the code for the following statements:

a. Replace all occurrences of the character e with E in s1 and assign the new string to s3.

b. Split Welcome to Java and HTML into an array tokens delimited by a space and assign the first two tokens into s1 and s2.

Best Wishes
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