بِسْمِ اللَّـهِ الرَّحْمَـٰنِ الرَّحِيمِ

Comp 1331 - java 1 revision

Chapters (7-9-18)

1- find the output questions. || 2- find the error. || 3- code.

اللهم انصر المجاهدين وثبت أقدامهم، واحفظ أهلنا في قطاع غزة

أصيل قدح - إيمان الغلبان

```java
public class Midterm {
    public static void main(String[] args) {

      int number = 0;
      int[] numbers = new int[1];

      m(number, numbers);

      System.out.println("number is " + number + " and numbers[0] is " + numbers[0]);
}


public static void m(int x, int[] y) {
    x = 3;
    y[0] = 3;
   }
}
```

A) number is 3 and numbers[0] is 3

B) number is 0 and numbers[0] is 3

C) number is 0 and numbers[0] is 0

D) number is 3 and numbers[0] is 0

```java
public class Midterm {
    public static void main(String[] args) {

      int number = 0; ←——
      int[] numbers = new int[1];

      m(number, numbers);

      System.out.println("number is " + number + " and numbers[0] is " + numbers[0]);
}


public static void m(int x, int[] y) {
    x = 3;
    y[0] = 3;
   }
}
```

A) number is 3 and numbers[0] is 3

B) number is 0 and numbers[0] is 3

C) number is 0 and numbers[0] is 0

D) number is 3 and numbers[0] is 0

```
public class Midterm {
public static void main(String[] args) {


          double[] x = {2.5, 3, 4};
          for (double value: x)

System.out.print(value + " ");

}
   }
```

A) The program displays 2.5, 3, 4

B) The program displays 2.5 3 4

C) The program displays 2.5 3.0 4.0

D) The program has a syntax error because value is undefined.

```
public class Midterm {
public static void main(String[] args) {


          double[] x = {2.5, 3, 4};
          for (double value: x)

System.out.print(value + " ");

}
   }
```

A) The program displays 2.5, 3, 4

B) The program displays 2.5 3 4

C) The program displays 2.5 3.0 4.0

D) The program has a syntax error because value is undefined.

```java
public class Midterm {
public static void main(String[] args) {

    int[] oldList = {1, 2, 3, 4, 5};
    reverse(oldList);

    for (int i = 0; i < oldList.length; i++)
    System.out.print(oldList[i] + " ");
    }


    public static void reverse(int[] list) {

      int[] newList = new int[list.length];

      for (int i = 0; i < list.length; i++){

    newList[i] = list[list.length - 1 - i];

      }

      list = newList;

    }
    }
```

A) The program displays 1 2 3 4 5.

B) The program displays 1 2 3 4 5
and then raises an ArrayIndexOutOfBoundsException.

C) The program displays 5 4 3 2 1.

D) The program displays 5 4 3 2 1
and then raises an ArrayIndexOutOfBoundsException.

```java
public class Midterm {
public static void main(String[] args) {

    int[] oldList = {1, 2, 3, 4, 5};
    reverse(oldList);

    for (int i = 0; i < oldList.length; i++)
    System.out.print(oldList[i] + " ");
    }


    public static void reverse(int[] list) {

      int[] newList = new int[list.length];

      for (int i = 0; i < list.length; i++){

    newList[i] = list[list.length - 1 - i];

      }

      list = newList;

    }
    }
```

A) The program displays 1 2 3 4 5.

B) The program displays 1 2 3 4 5
and then raises an ArrayIndexOutOfBoundsException.

C) The program displays 5 4 3 2 1.

D) The program displays 5 4 3 2 1
and then raises an ArrayIndexOutOfBoundsException.

Which of the following statements are correct?

A) A reference variable is an object.

B) A reference variable references to an object.

C) A data field in a class must be of a primitive type.

D) A data field in a class must be of an object type.

Which of the following statements are correct?

A) A reference variable is an object.

B) A reference variable references to an object.

C) A data field in a class must be of a primitive type.

D) A data field in a class must be of an object type.

```java
class TempClass {

       int i;

   public void TempClass(int j) {
       int i = j;
}


}
public class Midterm {

  public static void main(String[] args) {

      TempClass temp = new TempClass(2);
}
    }
```

A) The program has a compile error because TempClass does not have a default constructor.

B) The program has a compile error because TempClass does not have a constructor with an int argument.

C) The program compiles fine, but it does not run because class C is not public.

D) The program compiles and runs fine.

```java
class TempClass {

       int i;

   public void TempClass(int j) {
       int i = j;
}


}
public class Midterm {

  public static void main(String[] args) {

      TempClass temp = new TempClass(2);
}
    }
```

A) The program has a compile error because TempClass does not have a default constructor.

B) The program has a compile error because TempClass does not have a constructor with an int argument.

C) The program compiles fine, but it does not run because class C is not public.

D) The program compiles and runs fine.

```java
public class Midterm {

  public static void main(String[] args) {

    int[] x = {1, 2, 3, 4, 5};
    myTest (x, 5);

    }
    public static void myTest(int[] x, int length) {

      System.out.print(" " + x[length - 1]);
      myTest (x, length - 1);

      }
    }
```

A) The program displays 1 2 3 4 6

B) The program displays 1 2 3 4 5 and then raises an ArrayIndexOutOfBoundsException.

C) The program displays 5 4 3 2 1.

D) The program displays 5 4 3 2 1 and then raises an ArrayIndexOutOfBoundsException.

```java
public class Midterm {

  public static void main(String[] args) {

    int[] x = {1, 2, 3, 4, 5};
    myTest (x, 5);

    }
    public static void myTest(int[] x, int length) {

      System.out.print(" " + x[length - 1]);
      myTest (x, length - 1);

      }
    }
```

A) The program displays 1 2 3 4 6

B) The program displays 1 2 3 4 5 and then raises an ArrayIndexOutOfBoundsException.

C) The program displays 5 4 3 2 1.

D) The program displays 5 4 3 2 1 and then raises an ArrayIndexOutOfBoundsException.

Given the declaration Circle[] x = new Circle[10],
which of the following statement is most accurate?

A) x contains an array of ten int values.

B) x contains a reference to an array and each element in the array can hold a reference to a Circle object.

C) x contains an array of ten objects of the Circle type.

D) x contains a reference to an array and each element in the array can hold a Circle object.

Given the declaration Circle[] x = new Circle[10],
which of the following statement is most accurate?

A) x contains an array of ten int values.

B) x contains a reference to an array and each element in the array can hold a reference to a Circle object.

C) x contains an array of ten objects of the Circle type.

D) x contains a reference to an array and each element in the array can hold a Circle object.

Encapsulation means:

A) that data fields should be declared private

B) that a class can extend another class

C) that a variable of supertype can refer to a subtype object

D) that a class can contain another class

Encapsulation means:

A) that data fields should be declared private

B) that a class can extend another class

C) that a variable of supertype can refer to a subtype object

D) that a class can contain another class

When invoking a method with an object argument,

A) the contents of the object

B) a copy of the object

C) the reference of the object

D) the object is copied, then the reference of the copied object

When invoking a method with an object argument,

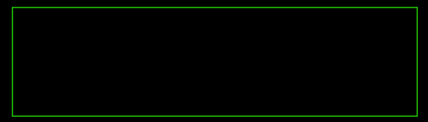
A) the contents of the object

B) a copy of the object

C) the reference of the object

D) the object is copied, then the reference of the copied object

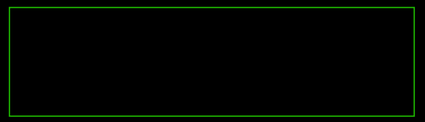
```java
public class Midterm {

  public static void main(String[] args) {

    int[] x = { 1, 2 };

    int i = 1;
    m(i, x);
    System.out.print(i + " , " + x[0]);

    }
    public static void m(int i, int[] list) {
      i = 11;
      list[0] = 11;
      }
    }
```



```java
public class Midterm {

  public static void main(String[] args) {

    int[] x = { 1, 2 };

    int i = 1;
    m(i, x);
    System.out.print(i + " , " + x[0]);

    }
    public static void m(int i, int[] list) {
      i = 11;
      list[0] = 11;
      }
    }
```

```
1 , 11
```


```java
public class Midterm {
  public static void main(String[] args) {
    int[] list1 = { 1, 2, 3 };
    int[] list2 = list1;
    list2[1] = 10;
    System.out.println(list1[1]);
    }
}
```



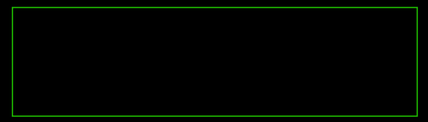
```java
public class Midterm {
  public static void main(String[] args) {
    int[] list1 = { 1, 2, 3 };
    int[] list2 = list1;
    list2[1] = 10;
    System.out.println(list1[1]);
    }
}
```

```
10
```


```java
public class Midterm {
  static int count = 0;
  public static void main(String[] args) {
    f(4);
  System.out.println(count);
  }

  public static int f(int n) {

    count++;
  if (n == 0) return 1;
  else
  return f(n - 1) + n * n;
}
}
```



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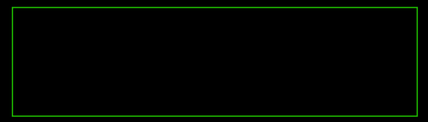
public class Midterm {
  static int count = 0;
  public static void main(String[] args) {
    f(4);
  System.out.println(count);
  }

  public static int f(int n) {

    count++;
  if (n == 0) return 1;
  else
  return f(n - 1) + n * n;
}
}
```

5

```java
public class Midterm {
  public static void main(String[] args) {
    A a1 = new A();
    System.out.print(a1.j);
    A a2 = new A();
    System.out.print(" " + a2.j);
    }
  }
    class A {
    int i = 1;
    static int j = 1;
    A() {
    i++;
    j++; }
}
```



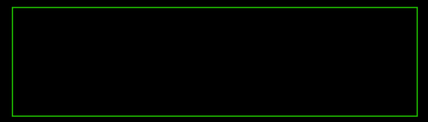
```java
public class Midterm {
  public static void main(String[] args) {
    A a1 = new A();
    System.out.print(a1.j);
    A a2 = new A();
    System.out.print(" " + a2.j);
    }
  }
    class A {
    int i = 1;
    static int j = 1;
    A() {
    i++;
    j++; }
}
```

```
2 3
```


```
public class Test {
  }
```

What is the prototype for no arg construction?

A) Test().
B) public test().
C) public Test().
D) Public void Test().



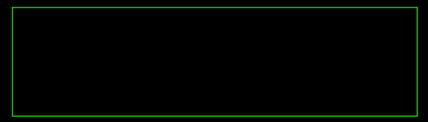
```
public class Test {
  }
```

What is the prototype for no arg construction?

A) Test().
B) public test().
C) public Test().
D) Public void Test().

A) public Test().

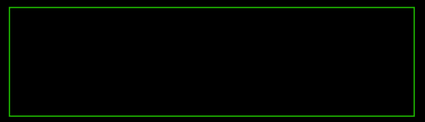
```java
public void test() {
    int odd = 1;
    if(odd)

    System.out.print("odd");
    else
      System.out.print("even");
  }
```



```java
public void test() {
    int odd = 1;
    if(odd)

    System.out.print("odd");
    else
      System.out.print("even");
  }
```

compilation fails

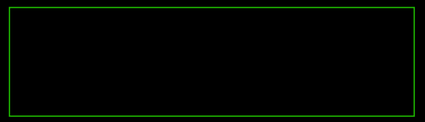
```java
public class Midterm {
  public static void main(String[] args) {
    System.out.println(m(5));

    }



  public static int m(int k) {
if (k==0||k==1)
  return 1;
else
  return k*m(k-1);
  }
  }
```



```java
public class Midterm {
  public static void main(String[] args) {
    System.out.println(m(5));

    }



  public static int m(int k) {
if (k==0||k==1)
  return 1;
else
  return k*m(k-1);
  }
  }
```

```
120
```


```java
public class Midterm {
  public static void main(String[] args) {
    int [] x = {1,2,3,4};
    int [] y =x;
    x=new int[2];
    System.out.print(x[0]+" "+y[0]);

  }
  }
```



```java
public class Midterm {
  public static void main(String[] args) {
    int [] x = {1,2,3,4};
    int [] y =x;
    x=new int[2];
    System.out.print(x[0]+" "+y[0]);

  }
  }
```

```
0 1
```


```java
class Test {
private double i;
public Test(double i) {
  this.t();
  this.i = i;
}
public Test() {
  System.out.println("Default constructor");
  this(1);
}
public void t() {
  System.out.println("Invoking t");
  }
}
```


```java
class Test {
private double i;
public Test(double i) {
  this.t();
  this.i = i;
}
public Test() {
  System.out.println("Default constructor");
  this(1);
}
public void t() {
  System.out.println("Invoking t");
  }
}
```

```java
public class Midterm {

    public static void main(String[] args) {
    int n = 2;
    xMethod(n);
    System.out.println("n is " + n);
    }
    private void xMethod(int n) {
    n++; }
    }
```


```java
public class Midterm {

    public static void main(String[] args) {
    int n = 2;
    xMethod(n);
    System.out.println("n is " + n);
    }
    private void xMethod(int n) {
    n++; }
    }
```


```java
public class Midterm {

  int x;
  public Midterm(String t) {
    System.out.println("Test");
  }
  public static void main(String[] args) {
    Midterm test = new Midterm();
  System.out.println(test.x); }
  }
```


```java
public class Midterm {

  int x;
  public Midterm(String t) {
    System.out.println("Test");
  }
  public static void main(String[] args) {
    Midterm test = new Midterm();
  System.out.println(test.x); }
  }
```


```java
public class Midterm {
  public static void main(String[] args) {
    Random r ;
    System.out.println("r is " + r); }
  }
```


```java
public class Midterm {
  public static void main(String[] args) {
    Random r ; ←————————————
    System.out.println("r is " + r); }
  }
```


```java
public class Midterm {
  public static void main(String[] args) {
    int list = new int[4];
    for (int i = 0; i <= list.length(); i++) {
    sum += list[i]; }
    }
  }
```

Chapter 7 - Single dimension array | find the error.

```java
public class Midterm {
  public static void main(String[] args) {
    int list = new int[4];
    for (int i = 0; i <= list.length(); i++) {
    sum += list[i]; }
    }
  }
```


Write a test program that prompts the user to enter a list and displays whether the list is sorted or not.

Here is a sample run.
Note that the first input from the user should be
 the number of the elements in the
list.

Enter list size:8 Enter list: 10 1 5 16 61 9 11 1 The list is not sorted	Enter list size:10 Enter list: 1 1 3 4 4 5 7 9 11 21 The list is already sorted

Write a java program that displays a **Pascal triangle**. The program prompts the user to enter the number of **rows** and displays the triangle. Here is a sample run:

Note: You might need to write a method that computes the value V(r, c) = $\frac{r!}{(r-c)!c!}$

Where **r** is for row number (starts from 0) and **c** for the column number (starts from 0). e.g. **V(4, 2) = 6** ➔

```
Enter the number of rows: 6
                1
              1   1
            1   2   1
          1   3   3   1
        1   4   6   4   1
      1   5  10  10   5   1
```

```
import java.util.*;
```

Write the code for the following (18 Marks)

A) An immutable class called Clock that represents 24 hours system and contains the following:

- Three private integer variables: hours, minutes and seconds.
- No-args constructor that initialize the clock to midnight 0:0:0
- A constructor that takes three integers and set the values of hours(between 0 and 23) minutes (between 0 and 59) and seconds(between 0 and 59) otherwise a default 0 value is given for wrong not valid values.
- Implement getElapsedTime method that returns a long in milliseconds from the default midnight time (0:0:0).
- Implement printInfo method that prints the clock as hours:minutes:seconds.
- You should write any appropriate setter/getter methods for attributes.

B) (12 Marks)Write a driver class that creates an array of five clocks with random values. Your program should print the info about the latest clock and you should write the following method inside the driver class.

public static Clock latest(Clock [] array)

A) Design a class named **Student**. The class contains:

- A public ***id*** number with a default value of ***1234567***.
- A String **name** with a default value of ***Abbass***.
- A private char ***gender*** with a default value of ***M*** and a setter method. Note gender valid values are ***M*** or ***F***.
- A private double array for ***grades*** with a default value of one grade ***55*** and add a setter method that takes double array.
- A private Date for ***enrollment date*** with a default value of current system date.
- A private static int for ***study plan*** with a default value of ***129*** and a getter method.
- A no-argument constructor that creates a default student object using the default values.
- An argument constructor that takes id, name, and gender to create a student object using the input arguments.
- A private method ***calculateAverage*** that calculates and returns the average grades.
- A public method ***getLetterGrade*** that calculates the grades and return the letter grade according to the following criteria:
  - Average >= 90 ➔ **A**
  - 90 > Average > 80 ➔ **B**
  - 80 >= Average > 70 ➔ **C**
  - 70 >= Average >= 60 ➔ **D**
  - Average < 60 ➔ **F**
- A public method ***printStudentInfo*** that generate an output like the following:

```
Student ID: 1213456
Name: Mamoun
Gender: M
Study Plan: 129
Enrollment Date: Sat May 21 09:28:48 AST 2022
Letter Grade: B
```

Draw a UML diagram for the **Student** class and then implement the class:

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B) Write a test program that create a student object with the following information:

- Id → 1213456
- Name → Mamoun
- Gender → M
- Grades → 95.5 , 87.6, and 70.4

Then call method ***printStudentInfo***