Time: **75 minutes**

جامعة بيرزيت
BIRZEIT UNIVERSITY
COMP231 (Spring 2014/2015)
Midterm Exam (November 26th 2015)

94.5 /100

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[Q1 20%] Multiple choices:

1)	Which access modifier, used when defining a member, indicates that only one such member is available for all instances of the class?
○ A)	final
○ B)	private
☒ C)	protected
○ D)	static

2)	In order to declare a constant, the declaration must use which Java keyword?
○ A)	int
☒ B)	final
○ C)	static
○ D)	void

3)	Suppose a String variable s is initialized to the value "inheritance". What value is returned by the call **s.substring(2, 5)** ?
○ A)	nher
○ B)	nheri
○ C)	heri
☒ D)	her

5-2 = 3 صحيح

2 نقطة البداية

4)	How many constructors can a class have?
○ A)	Exactly one
○ B)	At least one but no more than three
○ C)	Exactly the same as the number of data members
☒ D)	There is no restriction on the number of constructors

2 — على رقم ١

5)	Suppose c1 and c2 are objects of the class Circle. A Circle has a single data member, its radius. The Circle class has a default constructor (implemented correctly), but no other methods have been defined in the implementation of the Circle class. What will happen when we try to execute this code? **Circle c1 = new Circle(12.0);** **Circle c2 = new Circle(12.0);** **boolean same = (c1.equals(c2));**
O A)	The code will not compile because **equals** method has not been implemented in Circle.
☒ B)	The value of same will be false.
O C)	The value of same will be true.
O D)	The value of same will be 1.

6)	Consider the following code that appears in a test class. **A a = new A();** **int c = a.b;** In order for this code to work, which statement must be true?
O A)	a must be declared public inside class A
☒ B)	b must be declared public inside class A
O C)	c must be declared public inside class A
O D)	Method b( ) must return int

7)	In Java, a class can extend _____.
☒ A)	at most 1 class
O B)	at most 16 classes
O C)	at most 32 classes
O D)	as many classes as required

8)	A method in a subclass is said to _____ an inherited method if it has the same method declarations as the inherited method.
O A)	copy
☒ B)	overload
O C)	override
O D)	cancel

9)	If the field modifier _____ is specified in a method definition, the method cannot be overridden by a subclass.
O A)	public
O B)	protected
O C)	abstract
☒ D)	final

10)	The _____ access modifier hides the members of a class from the class's clients but makes them available to a subclass and to another class within the same package.
O A)	private
O B)	public
☒ C)	protected
O D)	package access

-2

16

[Q2 30%] What is the output of the following code?

	Code	Output

1	public class Test {
	public static void main(String[] args) {
	int[] list1 = {1, 2, 3};
	int[] list2 = list1;
	list2[1] = 100;
	System.out.println(list1[1]);
	}
	}
		100

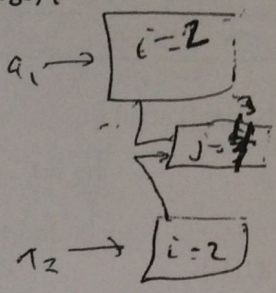
2	public class Test {
	public static void main(String[] args) {
	int[] x = {1, 2};
	int i = 2;
	m(i, x);
	System.out.print(i + "," + x[0]);
	}
	
	public static void m(int i, int[] list) {
	i = 9;
	list[0] = 9;
	}
	}
		2,9

3	public class Test {
	public static void main(String[] args) {
	int[][] x = {{2, 1}, {1, 7, 2}};
	System.out.println(m(x[1]));
	}
	
	public static int m(int[] m) {
	int result = 0;
	for (int i = 0; i < m.length; i++)
	result += m[i];
	return result;
	}
	}
		10

4	public class Test {
	public static void main(String[] args) {
	A a1 = new A();
	A a2 = new A();
	System.out.println(a1.equals(a2));
	}
	}
	class A {
	int x = 1;
	}
		false

5

```
public class Test {
  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 = 2;
  A() {
    i++;
    j++;
  }
}
```



3 4

6

```
import java.util.*;
public class Test {
  public static void main(String[] args) {
    ArrayList<Integer> list = new ArrayList<>();
    list.add(1);
    list.add(2);
    list.add(3);
    list.remove(2);
    System.out.println(list);
  }
}
```

[1, 2]

7

```
public class Test {
  public static void main(String[] args) {
    new Person().printPerson();
    new Student().printPerson();
  }
}
class Student extends Person {
  private String getInfo() {
    return "Student";
  }
}
class Person {
  private String getInfo() {
    return "Person";
  }
  public void printPerson() {
    System.out.println(getInfo());
  }
}
```

Person
Student

-1-5

8

```
public class Test {
  public static void main(String[] args) {
    Object circle1 = new Circle();
    Object circle2 = new Circle();
    System.out.println(circle1.equals(circle2));
  }
}
class Circle {
  double radius = 1;
  public boolean equals(Circle circle) {
    return this.radius == circle.radius;
  }
}
```

false

9

```
public class Test {
  public static void main(String[] args) {
    new A();
    new B();
  }
}
class A {
  int i = 7;
  public A() {
    setI(20);
    System.out.println("i from A is " + i);
  }
  public void setI(int i) {
    this.i = 3 * i;
  }
}
class B extends A {
  public B() {
    System.out.println("i from B is " + i);
  }
  public void setI(int i) {
    this.i = 2 * i;
  }
}
```

i from A is 60
i from A is 40
i from B is 40

10

```
public class Test {
  public static void main(String[] args) {
    String s = "Java";
    StringBuilder builder = new StringBuilder(s);
    change(s, builder);
    System.out.println(s);
    System.out.println(builder);
  }
  private static void change(String s, StringBuilder builder) {
    s = s + " and HTML";
    builder.append(" and HTML");
  }
}
```

Java
Java and HTML

28.5

Define the errors

[Q3 25%] What problem arises in **compiling** the following programs (if any), suggest a fix to the **compilation error(s)**:

	Program	Error (if any)

1	public class C {
	private int p;
	public C() {
	System.out.println("C's no-arg constructor invoked");
	this(0);
	}
	public C(int p) {
	p = p;
	}
	public void setP(int p) {
	p = p;
	}
	}
		this Keyword must be defined first in the constructor

2	public class Test {
	private int id;
	public void m1() {
	this.id = 45;
	}
	public void m2() {
	Test.id = 45;
	}
	}
		id is not static it can't be called using the Class Name

3	public final class A {
	int i;
	public void m() {}
	}
	
	class B extends A {
	public void m1(String[] args) {
	System.out.println(i);
	m();
	}
	}
		A is a final class can't inherit from it
		can't extends from class A

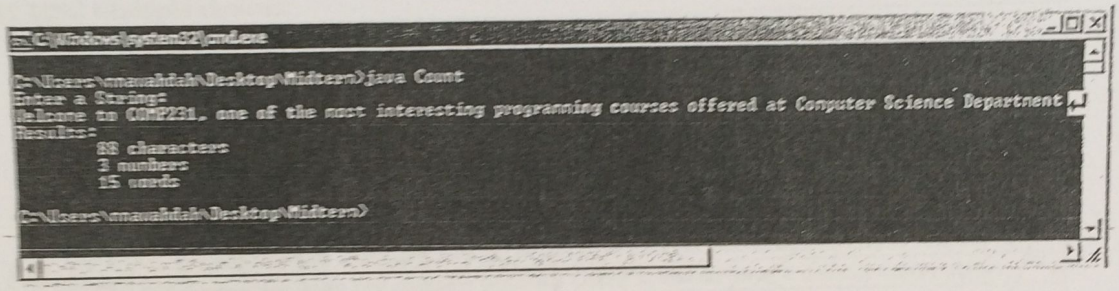
4	package p1;
	public class A {
	protected int i;
	void m() {}
	}
	
	package p2;
	public class B extends A {
	public void m1(String[] args) {
	System.out.println(i);
	m();
	}
	}
		the method m() in class A in package p1 cannot be invoked from another package since its modifier (default

25

5	class A {
	  public A(int x) { }
	}
	class B extends A {
	  public B() { }
	}
	public class C {
	  public static void main(String[] args) {
	  B b = new B();
	  }
	}
		this line have the keyword super(); implicitly
		that invokes the no-arg constructer in class A
		but A doesn't have no-argument constructor → error

[Q4 25%]

Write a Java program "Count" that will count the number of letters (a-z, A-Z), numbers (0-9), and words, in a string. The following is a sample run:




```
public class Count {
    public static int NumOfChar (String s) {
        int count = 0;
        for (int i=0 ; i < s.length(); i++)
            if (Character.isLetter (s.charAt(i)))
                count ++;
        return count;
    }
    public static int numOfDigit (String s){
        int count = 0;
        for (int i=0; i < s.length(); i++)
            if (Character.isDigit(s.CharAt(i)))
                count ++;
        return count;
    }
```

```
public static numOfWords (String s){
  String[] = s.split("[:,/*?!^&|; ]");
    for(int i=0 ; i < z.length ; z++)
        for(int j=0 ; j < z[i].length() ; j++)
      if (Character.isLetter (z[i].char(j)
        if (character.isLetter (z[i].ch
        count ++;
  return count ;
}
```

```
public class Test {
  public static void main (String[] args) {
    System.out.print("enter a String ");
      Scanner input = new Scaner(System.in);
    String s = input.next();
    System.out.println("results :");
    System.out.println (Count.numOfChar(s) + "Characte
    System.out.println (Count.numOfDigit(s) + "numbers"
    System.out.println (Count.numOfWords(s) + "words"
  }
}
```

concatena

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Good Luck!