Final Exam

Study Guide

Name: _____

1. Which one is a valid declaration of a boolean?

a) boolean b1 = 1;

b) boolean b2 = 'false';

c) boolean b3 = false;

d) boolean b4 = 'true'

2. What is the output of this program?

```
class array_output {
    public static void main(String args[])
    {
        char array_variable [] = new char[10];
        for (int i = 0; i < 10; ++i) {
            array_variable[i] = 'i';
            System.out.print(array_variable[i] + " " );
            i++;
        }
    }
}
```

a) `i i i i i`

b) `0 1 2 3 4`

c) `i j k l m`

d) None of the mentioned

3. What is the output of this program?

```
class evaluate {
    public static void main(String args[])
    {
        int a[] = {1,2,3,4,5};
        int d[] = a;
        int sum = 0;
        for (int j = 0; j < 3; ++j)
             sum += (a[j] * d[j + 1]) + (a[j + 1] *d[j]);
       System.out.println(sum);
    }
}
```

a) 38

b) 39

c) 40

d) 41

4. Which of these is an incorrect array declaration?

```
a) int arr[] = new int[5];
b) int [] arr = new int[5];
c) int arr[];
   arr = new int[5];
d) int arr[] = int [5] new;
```

5. Which of these is an incorrect Statement?

a) It is necessary to use new operator to initialize an array.

b) Array can be initialized using comma separated expressions surrounded by curly braces.

c) Array can be initialized when they are declared.

d) None of the mentioned

6. What is the output of this program?

```
class array_output {
    public static void main(String args[])
    {
        int array_variable [] = new int[10];
        for (int i = 0; i < 10; ++i) {
            array_variable[i] = i;
            System.out.print(array_variable[i] +" ");
            i++;
        }
    }
}
```

a) 0 2 4 6 8

b) 1 3 5 7 9

c) 0 1 2 3 4 5 6 7 8 9

d) 1 2 3 4 5 6 7 8 9 10

7. What is the output of this program?

```
class array_output {
    public static void main(String args[])
    {
        int array_variable[][] = {{1, 2, 3},{4 , 5, 6},{7, 8,
        9}}; int sum = 0;
        for (int i = 0; i < 3; ++i)
            for (int j = 0; j <  3 ; ++j)
                sum = sum + array_variable[i][j];
        System.out.print(sum / 5);
    }
}
```

a) 8

b) 9

c) 10

d) 11

8. What is the output of this program?

```
class increment {
    public static void main(String args[])
    {
        double var1 = 1 + 5;
        double var2 = var1 /
        4; int var3 = 1 + 5;
        int var4 = var3 / 4;
        System.out.print(var2 + " " + var4);
    }
}
```

a) 1 1

b) 0 1

c) 1.5 1

d) 1.5 1.0

9. What is the output of this program?

```
class Output {
        public static void main(String args[])
        {
                int a = 1;
                int b = 2;
                int c;
                int d;
                c = ++b;
                d = a++;
                c++;
                b++;
                ++a;
                System.out.println(a + " " + b + " " + c);
        }
    }
```

a) 3 2 4

b) 3 2 3

c) 2 3 4

d) 3 4 4

10. Which of these is returned by greater than, <, and equal to, ==, operator?

a) Integers

b) Floating - point numbers

c) Boolean

d) None of the mentioned

11. Which of the following operators can operate on a boolean variable?

1. &&

2. ==

3. ?:

4. +=

a) 3 & 2

b) 1 & 4

c) 1, 2 & 4

d) 1, 2 & 3

12. Which of these statement is correct?

a) true and false are numeric values 1 and 0.

b) true and false are numeric values 0 and 1.

c) true is any non zero value and false is 0.

d) true and false are non numeric values.

13. What is the output of this program?

```
class Relational_operator {
        public static void main(String args[])
        {
            int var1 = 5;
            int var2 = 6;
            System.out.print(var1 > var2);
        }
    }
```

a) 1

b) 0

c) true

d) false

14. What is the output of this program?

```
class operators {
    public static void main(String args[])
    {
        int var1 = 5;
        int var2 = 6;
        int var3;
        var3 = ++ var2 * var1 / var2 +
        var2; System.out.print(var3);
    }
}
```

a) 10

b) 11

c) 12

d) 56

15. What is the output of this program?

```
class jump_statments {
    public static void main(String args[])
    {
        int x = 2;
        int y = 0;
        for ( ; y < 10; ++y) {
            if (y % x == 0)
                continue;
            else if (y == 8)
                break;
            else
               System.out.print(y + " ");
        }
    }
```

a) 1 3 5 7

b) 2 4 6 8

c) 1 3 5 7 9

d) 1 2 3 4 5 6 7 8 9

16. What is the stored in the object obj in following lines of

code? box obj;

a) Memory address of allocated memory of object.

b) NULL

c) Any arbitrary pointer

d) Garbage

17. Which of the following is a valid declaration of an object of class Box? a) Box obj = new Box();

b) Box obj = new Box;

c) obj = new Box(); d)

new Box obj;

18. Which of these statement is incorrect?

a) Every class must contain a main() method.

b) Applets do not require a main() method at all.

c) There can be only one main() method in a program.

d) main() method must be made public.

19. What is the output of this program?

```
class main_class {
        public static void main(String args[])
        {
            int x = 9;
            if (x == 9) {
                int x = 8;
                System.out.println(x);
            }
        }
    }
```

a) 9

b) 8

c) Compilation error

d) Runtime error

20. Which of the following statements is correct?

a) Public method is accessible to all other classes in the hierarchy

b) Public method is accessible only to subclasses of its parent class

c) Public method can only be called by object of its class.

d) Public method can be accessed by calling object of the public class.

21. What is the output of this program?

```
class box {
    int width;
    int height;
    int length;
}
class mainclass {
    public static void main(String args[])
    {
        box obj = new
        box(); obj.width =
        10; obj.height = 2;
        obj.length = 10;
        int y = obj.width * obj.height * obj.length;
        System.out.print(y);
    }
}
```

a) 12

b) 200

c) 400

d) 100

22. What is the output of this program?

```
class box {

    int width;

    int height;

    int length;

}

class mainclass {

    public static void main(String args[])

    {

        box obj1 = new box();

        box obj2 = new box();

        obj1.height = 1;

        obj1.length = 2;

        obj1.width = 1;

        obj2 = obj1;

        System.out.println(obj2.height);

    }

}
```

a) 1

b) 2

c) Runtime error

d) Garbage value

23. What is process of defining two or more methods within same class that have same name but different parameters declaration?

a) method overloading

b) method overriding

c) method hiding

d) None of the mentioned

24. Which of the following is a method having same name as that of it's class? a) finalize

b) delete

c) class

d) constructor

25. What is the output of this program?

```
class overload
    { int x;
  int y;
    void add(int a)
        { x = a + 1;
    }
    void add(int a, int
        b){ x = a + 2;
    }
}
class Overload_methods {
    public static void main(String args[])
    {
        overload obj = new
        overload(); int a = 0;
        obj.add(6);
        System.out.println(obj.x);
    }
}
```

a) 6

b) 7

c) Compilation error

d) Runtime error

26. What is the output of this program?

```
public class Main {
        public static void main(String[] args)
                { String str1 = "Hello";
                String str2 = "hello";
                if (str1 != str2)
                        System.out.println("Hello");
                else
                        System.out.println("hello");
        }
}
```

a) Hello

b) hello

c) Compilation error

d) Run time error

27. Which of these keyword must be used to inherit a class?

a) super

b) this

c) extent

d) extends

28. What is the output of this program?

```
class A {
    public int i;
    private int j;
}
class B extends A {
    void display() {
        super.j = super.i + 1;
        System.out.println(super.i + " " + super.j);
    }
}
class inheritance {
    public static void main(String args[])
    {
        B obj = new
        B(); obj.i=1;
        obj.j=2;
        obj.display();
    }
}
```

a) 2 2

b) 3 3

c) Runtime Error

d) Compilation Error

29. What is the output of this program?

```
class A {
    int i;
    void display() {
        System.out.println(i);
    }
}
class B extends A
    { int j;
    void display() {
        System.out.println(j);
    }
}
class inheritance_demo {
    public static void main(String args[])
    {
        B obj = new
        B(); obj.i=1;
        obj.j=2;
        obj.display();
    }
}
```

a) 0

b) 1

c) 2

d) Compilation Error

30. Which method of Class class is used to register the driver class, This method is used to dynamically load the driver class?

a) forName()

b) getConnection()

c) createStatement()

d) executeQuery()

31. Given a vector of integers v = (1, 2, 3, 4), write Java code for inserting these numbers into (a) an Array, and (b) an ArrayList (DECLARE ALL VAR's):

(a) Array Code	(b) Array List Code

int[] arr = new int[]{1,2,3,4};
OR
int[] arr = new int[4];
arr[0] = 1;
arr[1] = 2;
arr[2] = 3;
arr[3] = 4;
	ArrayList al = new ArrayList();
	al.add(1);
	al.add(2);
	al.add(3);
	al.add(4);

32. This is an example of prepared statement interface that ?

```
PreparedStatement stmt=con.prepareStatement("select * from cars");

ResultSet rs=stmt.executeQuery();

while(rs.next()){

System.out.println(rs.getInt(1)+" "+rs.getString(2));

}
```

a) deletes the record

b) retrieve the record

c) updates the record

d) inserts the record

33. JDBC stands for?

a) Java database connectivity

b) Java database code

c) Java database communications

d) Java database connection

34. Which of the tool is used to compile java code?

a) java

b) javac

c) jar

d) javacompile

35. Which of the following tool used to execute java code.

a) javarun

b) java

c) exejava

d) javacompile

36. If a prepared statement preparedStatement is a statement object and you want to pass a SQL INSERT statement to your DB, you can execute the statement using _____.

a) preparedStatement.executeInsert();

b) preparedStatement.executeUpdate();

c) preparedStatement.executeQuery();

d) preparedStatement.queryDelete();

37. SQL query output is retrieved through _____.

a) a QueryOutput object

b) a Statement object

c) a ResultSet Object

d) a ResultStatment object

38. Given

```
int counts[] = {7, 2, 9, 0, 1, 5, 5, 3, 9};
```

What does find3(counts, 9) return? find3 is defined as follows:

```
public int find3(int a[], int targetsum)
{
      int i = 0, sum =
      0; while (i < 3)
      {
            sum +=a[i];
            i++;
      }
      if (sum == targetsum)
            return 1;

      while (i < a.length)
      {
            sum += a[i] - a[i-3];
            if (sum == targetsum)
                  return i - 1;
            i++;
      }
      return sum;
}
```

a) -1
b) 1
c) 2
d) 17
e) 18
f) 19

39. What is the output of the following code ?

```
class A{
      static int i;
      A(){ ++i; }
      int get(){ return ++i;  }
}
class B extends A{
      private B(){ i++; }
      int get(){ return ( i + 3); }
}
class Q028 extends B{
      public static void main(String ka[]) {
            Q028 obj = new Q028();
            A ob = new A();
            ob = (A)obj;
            System.out.println(ob.get());
      }
}
```

a) 2
b) Compile error " No method matching get( ) found in class Q026."
c) 5
d) NullPointerException thrown at run-time .
e) Runtime error

40. What is the output of the following code?

```
    interface calculate {
        void cal(int item);
    }
    class display implements calculate {
        int x;
        public void cal(int item) {
            x = item * item;
        }
    }
    class interfaces {
        public static void main(String args[]) {
            display arr = new display;
            arr.x = 0;
            arr.cal(2);
            System.out.print(arr.x);
        }
    }
```

a) 0
b) 2
c) 4
d) None of the mentioned

Code Reading Programs

1. What is output of this program?

```
public class Test
{
  public static void main(String[] args)
  {
    System.out.println(5 % 4);
    System.out.println(5 / 4);
    System.out.println(5 + 4 * 2);
    System.out.println((5 + 4) *
    2);

    int x =1;
    x++;
    System.out.println(++x);

    x -= 4;
    System.out.println(x)
    ;
  }
}
```

2. What is contained in the array 'list' at the end of this program?

```
int[] list = { 5, 4, 3, 2, 1, 0 };

for (int i = 0; i < list.length-1; i++)
{
    list[i] += list[i+1];
}
```

3. Suppose you enter input 2 3 6 from the console, when you run the program. What is the output?

```
public class Test
{
  public static void main(String[] args)
  {
    java.util.Scanner input = new java.util.Scanner(System.in);
    double x = input.nextDouble();
    double y = input.nextDouble();
    double z = input.nextDouble();

    System.out.println("(x < y && y < z) is " + (x < y && y <
    z));
    System.out.println("(x < y || y < z) is " + (x < y || y <
    z));
    System.out.println("!(x < y) is " + !(x < y));
    System.out.println("(x + y < z) is " + (x + y < z));
    System.out.println("(x + y < z) is " + (x + y < z));
  }
}
```

4. What is the output of the following code: (Note the indentation / braces)

```
 Public class test {
       Public static void main(String[] args) {
             int x = 9;
             int y = 8;
             int z = 7;

             if (x > 9)
                 if (y > 8)
                     System.out.println("x > 9 and y > 8");
             else if (z >= 7)
                 System.out.println("x <= 9 and z >= 7");
             else
                 System.out.println("x <= 9 and z < 7");
       }
}
```

5. What is the value stored in count after the following loop is executed?

```
int count =0;
do
{
   System.out.println("Welcome to Java");
   count++;
}
while (count < 2);
      System.out.println(count);
```

6. What is the output of the following fragment?

```
for (int i = 4; i < 15; i++)
 {
   if (i % 4 == 1)
     System.out.print(i + " ");
 }
```

7. What will be printed when the following program is run?

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

  public static void xMethod(int n)
  {
    n++;
  }
}
```

8. What are the values of a, b and c at the specified point in the program below?

```
public static void main(String[] args)
{
      int a = 10;
      int b = 20;
      int[] c = { 5, 10, 15, 20 };

      foo(a,b,c);

 // what are the values of a, b & c at this point in the program?
}

public static void foo(int x, int y, int[] z)
{
      x += 5;
      y *= 2;
      for (int i = 0; i < z.length; i++)
      {
            z[i] -= 3;
      }
}
```

9. What is contained in the array list at the end of this code ?

```
int[] list = { 5, 4, 3, 2, 1 };
for ( int index = 0; index < list.length-1; index += 2 )
{
      list[index] += list[index + 1];
}
```

10. What is the output of the following program ?

```
public class Midterm {
      public static void main(String[] args)
            { int lhs = 9;
            int rhs = 3;
            int[] list = { 5, 4, 3, 2, 1 }; scram(list, lhs, rhs);
            System.out.println("Main: lhs = " + lhs + ", rhs = " +rhs);
            System.out.println("Main: list[3] = " + list[3]);
      }
      public static void scram(int[] list, int lhs, int rhs)
            { list[rhs] = lhs;
            lhs = list[1];
            rhs = list[list.length – 1];
            System.out.println("scram: lhs = " + lhs + ", rhs = " + rhs);
            System.out.println("scram: list[3] = " + list[3]);
      }
}
```

11. What is the output of the following code ?

```
int x = 3;
int y = 8;
int z = 5;
if ( x > 3 )
if ( y > 8 )
System.out.println("First line");
else if ( z >= 5 )
System.out.println("Second
line"); else
System.out.println("Third line");
System.out.println("Fourth line");
```

12. What is the output of the following code ?

```
int number = 11;
while ( number > 0 ) {
if ( number % 2 == 0 || number % 3 == 0 )
System.out.print(number);
else if ( number % 5 == 0  )
System.out.println();
number -= 3;
}
System.out.println(" !");
```

13. What is the output of this Java program?

```
public class Program1
{
    public static void main(String[] args)
    {
      int x = 4;
      while ( x <= 8 )
      {
            for ( int y = x; y > 1; y = y - 1 )
            {
                  if ( y % 2 == 0 )
                        System.out.print( "x" );
                  else
                        System.out.print( "y" );

            }
            System.out.println();
            x = x + 1;
      }

    }
}
```

14. What is the output of this Java program?

```
public class Program4
{
    public static void main(String[] args)
    {
        int n = -23;
        while ((n % 2) == -1)
        {
           if (n == 2)
               break;
           n = n + 2; System.out.println("n = " + n);
        }
     }
}
```

Short Essay

1. Explain *Overriding* and *Overloading* and also write example codes.

2. Explain *Polymorphism* with an example code.

3. Explain *Abstract* and *Interface* with an example code.

4. What kind of class cannot be instantiated as an object? Why?
Abstract classes cannot be instantiated because they may have one or more methods that lack an implementation.

5. What is the highest-level superclass in the Java language? What does this mean?
java.lang.Object. This means that all instances of all classes inherit the methods of Object, and can be stored in an Object reference.

6. What is a constructor and how is it used in Java?
A constructor is a method that is used to create a new instance of a class. The constructor of FooClass is invoked by "new FooClass(…args…)"

7. Explain the primary mechanism for code re-use in object-oriented programming?
Inheritance provides code re-use because it allows all specializations of a class to share a single implementation of methods, which are defined in the superclass.

8. What is an interface in Java, and how is it used?
An interface is a list of methods that a class which implements the interface must implement. Classes may implement multiple interfaces. This is useful because it allows an object to be stored in a variable whose type is any of the interfaces it implements, which is typically used for message passing and event handling (callbacks).

Coding Problems

1. Finish the program below by adding the code to print the running average, where the average is based on a moving set of three values. For this articular data, the program would print the average of {1, 2, 3}, then the average of {2, 3, 10}, then the average of {3, 10, 9}, and so forth, finishing with the average of {4, 5, 6}. Print the average to three decimal places. The code that you write should not be hard-coded to this particular data except for the fact that there are nine values in the list.

   ```
   int[] d = {1, 2, 3, 10, 9, 8, 4, 5, 6};
   ```

2. Write a program that prompts the user for a positive integer n and then produces an n × n multiplication table. You do not have to do any error-checking nor do you need to put row or column labels.

   Example:
   Enter a positive integer: 4

1	2	3	4
2	4	6	8
3	6	9	12
4	8	12	16

3. Write a program that prompts the user for a positive integer, n, and then prints a following shape of stars using nested for loop, System.out.print("*");, and System.out.println();. Example:
   Enter a positive integer: 5

```
          *
        *   *   *
      *   *   *   *   *
    *   *   *   *   *   *   *
  * *   *   *   *   *   * * *
```

4. Define a method that returns n prime numbers. n is an input argument. Return value type is integer array.
   For example,
   If n is 7, the method returns an array as follows. {2, 3, 5, 7, 11, 13, 17}

5. Write a program that prompts the user for a positive integer n and then sums the integers in the range of 100 to 200 (inclusive) that are evenly divisible by n. The program will print the final sum. You do not have to do any error-checking.

Example:

```
Enter a positive integer: 13
The sum is 1196
```

6. Write a program that prompts the user for positive integers, only stopping when a negative integer or zero is given. The program should then print out how many of the positive integers were odd.

Example:

```
Enter a positive integer (0 or negative to stop): 9
Enter a positive integer (0 or negative to stop): 4
Enter a positive integer (0 or negative to stop): 7
Enter a positive integer (0 or negative to stop): -3
You entered 2 odd integers.
```

7. Write a program that sums the integers in the range of 10 to 100 (inclusive) if the integer is evenly divisible by 4 or 6, but not both. For example, 16 should be part of the sum and 18 should be part of the sum, but not 24. Print the overall sum.

8. Write a program that prompts the user for a positive integer n and then produces an n × n multiplication table. You can assume that all values in the table can be printed with no more than three digits You do not have to do any error-checking nor do you need to put row or column labels.

Example:

```
Enter a positive integer: 4

1  2 3  4
2  4 6  8
3  6 9 12
4  8 12  16
```

9. Write a program that prompts the user 5 times for integer values, printing the current average after each number is entered. Print the average to two decimal places.

Example:

```
Enter a number: 5
The average of the first 1 numbers is 5.00
Enter a number: 6
The average of the first 2 numbers is 5.50
Enter a number: 10
The average of the first 3 numbers is 7.00
Enter a number: 3
The average of the first 4 numbers is 6.00
Enter a number: 8
The average of the first 5 numbers is 6.40
```

10. Write a function that when given two integers, x and y, returns the maximum divisor of x or y, excluding x or y themselves. For example, if the two integers are 8 and 9, the divisors of 8 (excluding 8) are 1, 2, and 4 while the divisors of 9 (excluding 9) are 1 and 3. The maximum is 4.

Please review all labs
Please review all slides and examples in the slides.
Please make sure what is class, object, constructor, inheritance, interface, abstract, overloading, and overriding. Please review how to use static field and method, how to define array, how to use final constant, format specifier, and access modifier.
Please remember how to open, read and write a file.

Do your best and good luck!