1. (10 Points) Valid or Invalid syntax?

a. `/*`
`   This is a block`
`   Comment that`
`   Spans 3 lines`
` */`
	Valid **Invalid**

b. `System.out.print(numDogs).`	**Valid** **Invalid**
c. int numCars = 5;	**Valid** **Invalid**

d. if (i == 5)
     i += 1;
     k -= 1;
   else
     i -= 1;
     k += 1;
	Valid **Invalid**

e. if (a > 5 && < 9) {
     a = a * 5;
   } else {
     a = a * 6;
   }
	Valid **Invalid**

2. (20 Points) A cashier distributes change using the maximum number of ten-dollar bills, followed by the maximum number of five-dollar bills, followed by one-dollar bills.

Add the statements to compute numTens, numFives and numOnes, given amountToChange. Hint: The / and % operators are useful.

```java
import java.util.Scanner;

public class ComputingChange {
   public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);

        System.out.println("Enter The Amount To Change: ");
        int amountToChange = scnr.nextInt();

        int numTens = 0;
        int numFives = 0;
        int numOnes = 0;

        /* Your solution goes here */




        System.out.println("numTens : " + numTens);
        System.out.println("numFives: " + numFives);
        System.out.println("numOnes : " + numOnes);

        return;
    }
}
```

3. (10 Points) Write the Java statements to compute $x = \sqrt{y^2 + z^2}$. You can assume that x, y and z are all **double** values.

4. (5 Points) Convert the binary number 00101010 to a decimal number.

5. (10 Points) Given the following code:

```java
import java.util.Scanner;
public class Switch {
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);
        System.out.println("Enter A Number From 1..4: ");
        int num = scnr.nextInt();

        switch (num) {
            case 1:
                System.out.println("One");
                break;
            case 2:
                System.out.println("Two");
            case 3:
                System.out.println("Three");
                break;
            case 4:
                System.out.println("Four");
            default:
                System.out.println("Invalid Number");
        }
        return;
    }
}
```

a. What is printed when the user enters 1?

d. What is printed when the user enters 4?

b. What is printed when the user enters 2?

e. What is printed when the user enters 5?

c. What is printed when the user enters 3?

6. (12 Points) Given the following string definition:

```
String str = "I like the Easter bunny";
```

a. Write the Java statement that would return the length of str.

b. What is the length of str?

c. Write the Java statement to find the index of the substring "Easter":

d. What is the index of the substring "bunny"?

e. What is the Java statement to change the word "like" to the word "love":

f. Write the Java statement to append " all the time!!!"

7. (20 Points) Write a **complete** Java program that prompts the user for *yearNumber*. Your
    program will then print out one of the following messages:

* *yearNumber* is a leap year
* *yearNumber* is not a leap year

8. (28 Points) Write a **complete** Java program that prompts the user for *monthNumber* (where 1 =
    January, 2 = February, … , 12 = December) and *date* (a number from 1 .. 31). Your program
    will then print out one of the following messages:

    - Error: *monthNumber* is not a valid month
    - Error: *date* is not a valid date
    - Error: *monthNumber* does not have *date* days
    - *monthNumber* *date* is monthName *date*.

    You can assume that February only has 28 days.

1. (10 Points) Valid or invalid syntax?

`a. //`
`    This is a block`
`    Comment that`
`    Spans 3 lines`
`  //`
	Valid	**Invalid**

b. `System.out.print("Dogs: " numDogs);`	**Valid**	**Invalid**
c. int tall = 6;	**Valid**	**Invalid**

d.   if (i ==5) {
      i += 1;
      k -= 1;
    } else {
      i -= 1;
      k += 1;
	Valid	**Invalid**

e.   if ((a > 5) && (a < 9)) {
      a = a * 7;
    } else {
      a = a * 3;
    }
	Valid	**Invalid**

2. (20 Points) A cashier distributes change using the maximum number of twenty-dollar bills, followed by the maximum number of ten-dollar bills, followed by five-dollar bills. You can assume that there will not be any one-dollar bills in the change.

Add the statements to compute numTwenties, numTens and numFives, given amountToChange. Hint: The / and % operators are useful.

```java
import java.util.Scanner;

public class ComputingChange {
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);

        System.out.println("Enter The Amount To Change: ");
        int amountToChange = scnr.nextInt();

        int numTwenties = 0;
        int numTens = 0;
        int numFives = 0;

        /* Your solution goes here */



        System.out.println("numTwenties : " + numTwenties);
        System.out.println("numTens      : " + numTens);
        System.out.println("numFives     : " + numFives);

        return;
    }
}
```

3. (10 Points) Write the Java statements to compute $x = \sqrt{y^3 - z^3}$. You can assume that x, y and z are all **double** values.

4. (5 Points) Convert the binary number 10010101 to a decimal number.

5. (10 Points) Given the following code:

```java
import java.util.Scanner;
public class Switch {
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);
        System.out.println("Enter A Number From 1..4: ");
        int num = scnr.nextInt();

        switch (num) {
            case 1:
                System.out.println("One");
            case 2:
                System.out.println("Two");
                break;
            case 3:
                System.out.println("Three");
            case 4:
                System.out.println("Four");
                break;
            default:
                System.out.println("Invalid Number");
        }

        return;
    }
}
```

a. What is printed when the user enters 1?

d. What is printed when the user enters 4?

b. What is printed when the user enters 2?

e. What is printed when the user enters 5?

c. What is printed when the user enters 3?

6. (12 Points) Given the following string definition:

```
String str = "March is the month of spring madness";
```

a. Write the Java statement that would return the length of str.

b. What is the length of str?

c. Write the Java statement to find the index of the substring "Spring":

d. What is the index of the substring "madness"?

e. What is the Java statement to change the word "month of" to the word "time for":

f. Write the Java statement to append " every year!!!"

7. (20 Points) Write a **complete** Java program that prompts the user for *yearNumber*. Your program will then print out one of the following messages:

- *yearNumber* is a leap year
- *yearNumber* is not a leap year

8.   (28 Points) Write a **complete** Java program that prompts the user for *monthNumber* (where 1 =
     January, 2 = February, ... , 12 = December) and *date* (a number from 1 .. 31). Your program
     will then print out one of the following messages:

     • Error: *monthNumber* is not a valid month
     • Error: *date* is not a valid date
     • Error: *monthNumber* does not have *date* days
     • *monthNumber date* is monthName *date*.

     You can assume that February only has 28 days.

1. (10 Points) Valid or invalid syntax?

a. `/*`
   `* This is a block`
   `* Comment that`
   `* Spans 3 lines`
   `*/`
	Valid **Invalid**

b. `System.out.print("Amy // Michael");`	**Valid** **Invalid**
c. int short = 6;	**Valid** **Invalid**

d. if (i == 5) {
    i += 1;
    k -= 1;
  } else {
    i -= 1;
    k += 1;
  }
	Valid **Invalid**

e. if (a < 7 || > 9) {
    a = a * 2;
  } else {
    a = a * 3;
  }
	Valid **Invalid**

2. (20 Points) A cashier distributes change using the maximum number of ten-dollar bills, followed by
the maximum number of five-dollar bills, followed by one-dollar bills.

Add the statements to compute numTens, numFives and numOnes, given amountToChange. Hint:
The / and % operators are useful.

```java
import java.util.Scanner;

public class ComputingChange {
   public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);

        System.out.println("Enter The Amount To Change: ");
        int amountToChange = scnr.nextInt();

        int numTens = 0;
        int numFives = 0;
        int numOnes = 0;

        /* Your solution goes here */




        System.out.println("numTens : " + numTens);
        System.out.println("numFives: " + numFives);
        System.out.println("numOnes : " + numOnes);

        return;
    }
}
```

3. (10 Points) Write the Java statements to compute $x = \sqrt{(\tan y)^2 - (\sin z)^2}$. You can assume that x, y and z are all **double** values.

4. (5 Points) Convert the decimal number 79 to an 8-bit binary number.

5. 10 Points) Given the following code:

```java
import java.util.Scanner;
public class Switch {
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);
        System.out.println("Enter A Number From 1..4: ");
        int num = scnr.nextInt();

        switch (num) {
            case 1:
                System.out.println("One");
                break;
            case 2:
                System.out.println("Two");
            case 3:
                System.out.println("Three");
                break;
            case 4:
                System.out.println("Four");
            default:
                System.out.println("Invalid Number");
        }
        return;
    }
}
```

a. What is printed when the user enters 1?   d. What is printed when the user enters 4?

b. What is printed when the user enters 2?   e. What is printed when the user enters 5?

c. What is printed when the user enters 3?

Total of 115 Points
Version 3

6. (12 Points) Given the following string definition:

```
String str = "This winter was not very cold";
```

a. Write the Java statement that would return the length of str.

b. What is the length of str?

c. Write the Java statement to find the index of the substring "not":

d. What is the index of the substring "cold"?

e. What is the Java statement to change the word "winter" to the word "March":

f. Write the Java statement to append ", that is great!!!"

7. (20 Points) Write a **complete** Java program that prompts the user for *yearNumber*. Your
    program will then print out one of the following messages:

    - *yearNumber* is a leap year
    - *yearNumber* is not a leap year

8. (28 Points) Write a **complete** Java program that prompts the user for *monthNumber* (where 1 =
    January, 2 = February, … , 12 = December) and *date* (a number from 1 .. 31). Your program
    will then print out one of the following messages:

    • Error: *monthNumber* is not a valid month
    • Error: *date* is not a valid date
    • Error: *monthNumber* does not have *date* days
    • *monthNumber date* is monthName *date*.

    You can assume that February only has 28 days.

1. (10 Points) Valid or invalid syntax?

a. `/*`
　　`This is a block // line 1`
　　`Comment that    // line 2`
　　`Spans 3 lines   // line 3`
　`*/`
	Valid　　　**Invalid**

b. `System.print(numDogs);`	**Valid**　　　**Invalid**
c. int very tall = 7;	**Valid**　　　**Invalid**

d. if (i == 5)
　　i += 1;
　else
　　i -= 1;
	Valid　　　**Invalid**

e. if ((a < 7) || a > 9)) {
　　a = a * 7;
　} else {
　　a = a * 4;
　}
	Valid　　　**Invalid**

2. (20 Points) A cashier distributes change using the maximum number of twenty-dollar bills, followed by the maximum number of ten-dollar bills, followed by five-dollar bills. You can assume that there will not be any one-dollar bills in the change.

Add the statements to compute numTwenties, numTens and numFives, given amountToChange. Hint: The / and % operators are useful.

```java
import java.util.Scanner;

public class ComputingChange {
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);

        System.out.println("Enter The Amount To Change: ");
        int amountToChange = scnr.nextInt();

        int numTwenties = 0;
        int numTens = 0;
        int numFives = 0;

        /* Your solution goes here */



        System.out.println("numTwenties : " + numTwenties);
        System.out.println("numTens     : " + numTens);
        System.out.println("numFives    : " + numFives);

        return;
    }
}
```

3. (10 Points) Write the Java statements to compute $x = \sqrt{(\cos y)^3 + (\tan z)^3}$. You can assume that x, y and z are all **double** values.

4. (5 Points) Convert the decimal number 59 to an 8-bit binary number.

5. (10 Points) Given the following code:

```java
import java.util.Scanner;
public class Switch {
    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);
        System.out.println("Enter A Number From 1..4: ");
        int num = scnr.nextInt();

        switch (num) {
            case 1:
                System.out.println("One");
            case 2:
                System.out.println("Two");
                break;
            case 3:
                System.out.println("Three");
            case 4:
                System.out.println("Four");
                break;
            default:
                System.out.println("Invalid Number");
        }

        return;
    }
}
```

a. What is printed when the user enters 1?

d. What is printed when the user enters 4?

b. What is printed when the user enters 2?

e. What is printed when the user enters 5?

c. What is printed when the user enters 3?

6. (12 Points) Given the following string definition:

```
String str = "I like programming in Java";
```

a. Write the Java statement that would return the length of str.

b. What is the length of str?

c. Write the Java statement to find the index of the substring "in":

d. What is the index of the substring "Java"?

e. What is the Java statement to change the word "like" to the word "love":

f. Write the Java statement to append ", it is fun!!!"

7. (20 Points) Write a **complete** Java program that prompts the user for *yearNumber*. Your
    program will then print out one of the following messages:

    - *yearNumber* is a leap year
    - *yearNumber* is not a leap year

8. (28 Points) Write a **complete** Java program that prompts the user for *monthNumber* (where 1 =
    January, 2 = February, … , 12 = December) and *date* (a number from 1 .. 31). Your program
    will then print out one of the following messages:

    - Error: *monthNumber* is not a valid month
    - Error: *date* is not a valid date
    - Error: *monthNumber* does not have *date* days
    - *monthNumber date* is monthName *date*.

    You can assume that February only has 28 days.