1.Use a decision structure to write an appropriate statement for each of the following:

a) if (grade >= 90) { System.out.println(“Great Job!”); }
b) if (number < 20 || number > 50) { System.out.println(“Error”); }
c) if (y < 100) { y += 2; }

2. Assume num1 and num2 contain integer values. Write an if-else if statement that displays one of the following messages as appropriate: First number is larger. Second number is larger. Numbers are equal.

```
if (num1 > num2) {
        System.out.println(“ First number is Bigger.”);
} else if (num2 > num1) {
        System.out.println(“ Second number is Bigger.”);
} else {
        System.out.println(“ Numbers are equal.”);
}
```

3a) Which is the appropriate word, odd or even for the blanks below?

```
 if (num % 2 == 0) {
 System.out.println(“even number");
 } else {
System.out.println("odd number");
}
```

b)Rewrite the if-else as a switch statment

```
switch (num % 2) {
   case 0:
      System.out.println("even number");
      break;
   case 1:
      System.out.println("odd number");
      break;
```

4. The nextInt() method in the Random class generates a random integer between 0 and a specified maximum value. Write a formula that includes the nextInt() method for each of the following situations:
   a) Generate a random integer between 1 and 50.
   b) Generate a random integer between 20 and 100.
   c) Generate a random double between 10 and 20, inclusive.

A:
Int In = random.nextInt(50) + 1; adding 1 shifts the numbers
B:int In = random.nextInt(80) + 20;
C:double Do = random.nextDouble(10) + 10;

5. Identify the logic errors in the statements below, which should display a single appropriate message for any value of age: if (age < 18) {
System.out.println("child");
} else if (age > 18 && age < 65) {
System.out.println("adult");
} else if (age > 65) {
System.out.println("senior");
}

```
if (age < 18) {
        System.out.println("child");
} else if (age => 18 && age < 65) {
        System.out.println("adult");
} else if (age => 65) {
        System.out.println("senior");
}
```

You have to add in equals

6)Given the following assignments, determine if each of the following expressions evaluates to true or false: size = 100 weight = 50 value = 75
a) size > 50 && weight == 50 -- true
b) value < 100 && !(weight == 50) -- False
c) size >= 100 || value >= 100 -- True
d) weight < 50 || size > 50 -- True
e) !(value < 75) -- True
f) !(size > 100 && weight >50 && value > 75) -- True
g) (value < 125 || weight < 76) && size ==100 -- True

True/False

8. Determine if each of the following are true or false. If false, explain why.
   a) The condition of an `if` statement must be a Boolean expression.
   b) A roundoff error can occur when comparing two integers.
   c) A nested `if` statement and an `if-else if` statement are the same.
   d) The expression in a `switch` statement must evaluate to a `double`.
   e) Numbers generated by a computer program are actually pseudorandom.
   f) Specifying a seed value results in a different sequence of "random" numbers each time the program is run.
   g) A compound Boolean expression can contain more than two Boolean expressions.
   h) In a logical And expression, both operands must be true for the expression to evaluate to true.
   i) In logical expressions, && is evaluated before !.
   j) The pow() method in the Math class is used for exponentiation.
   k) The statement `x = abs(-3);` will return the value 3.
   l) A diamond shaped object represents a decision in a flowchart.

A) True
B) False-Roundoff errors occur in floating-point due to the imprecise representation of real numbers unlike int
C) False- a nested if occurs when you place an if statement in the block of another if statement. A if-else if statement is a chain of commands starting with if then followed by more else if statments
D) False -Switch statements allaws you to check a value against other exact values for example if num is 1 do this; if num is 2 do that. Double can have tiny errors because they are stored in binary floating point.
E) True
F) False-seed values are the same set of numbers so that every time you start it will give the same set of numbers. Without it, you will get completely random numbers.
G) True
H) True
I) False-! binds tighter than && like order of operations in math

J) True
K) True
L) True