Q#1 Two pieces of code are said to be "execution equivalent" if they each produce the same output. Determine if the following pairs of code fragments are execution equivalent.

Code Pair A: equivalent_____   not equivalent_____

```
for( int i=0 ; i<10 ; i++)
{
     System.out.println(i);
}
```

```
int i=0;
while( i<10 )
{
     i++;
     System.out.println(i);
}
```

Code Pair B: equivalent_____   not equivalent_____

```
for( int i=10 ; i>0 ; i = i-2 )
{
     System.out.println(i);
}
```

```
int i=10;
while( i>0 )
{
     System.out.println(i);
     i = i-2;
}
```

Code Pair C: equivalent_____   not equivalent_____

```
for( int i=1 ; i<10 ; i++ )
{
     System.out.println(i);
}
```

```
int number = 1;
for( int i=9 ; i>0 ; i-- )
{
     System.out.println(number);
     number++;
}
```

Q#2 Fill in the blanks in the code fragment, so that when
executed, it produces the output indicated below.

Desired Output:

```
0 10 0
1 9 9
2 8 16
3 7 21
4 6 24
```

Code Fragment:

```
int forwardCounter = _____;

int backwardCounter = _____;


while( forwardCounter _____ backwardCounter )
{
    System.out.println( forwardCounter + " " +
                        backwardCounter + " " +
                ( _____ ) );


        forwardCounter _____;

        backwardCounter _____;
}
```

Q#3 Write the output that these lines of code generate. Use
the following variables and methods.

// MAIN
int a = 6;
int b = 8;
int c = 2;
	private static int foo(
	int b, int c)
	{
	        return b-c;
	}
		private static void bar(int a, int b)
		{
		        int temp = a;
		        a = b;
		        b= temp;
		}

Code as called from main

Output

1pt	A.	`System.out.println( a / c );`	
1pt	B.	`System.out.println( a % b );`	
1pt	C.	`System.out.println( a + b * c);`	
1pt	D.	`System.out.println( a > b || b > c );`	
1pt	E.	`System.out.println( a < b && b < c );`	
1pt	F.	`System.out.println((double)(a+b+c)/3);`	
1pt	G.	`System.out.println( foo( a, b) );`	

1pt	H.	`bar( a, b );`
		`System.out.println("a = " + a +`
		`                  ", b = " + b);`	

Q#4 Write the output that these lines of code generate.

A.
```java
String s = new String("Pittsburgh");
int index = 0;

while( s.charAt(index) != 's' )

{    System.out.print(s.charAt(index));

    index++;

}
```
Outputs:

B.

```java
String city = new String("Colorado Springs");
System.out.println( city.substring(11, city.length()-1) );
```
Outputs:

C.

```java
int i = 15;
do{
    System.out.print( i + "\t" );
    i = i * 2 / 3;
}while( i > 10 );
```

Outputs:

D.

```java
for( int j=0 ; j<10 ; j++ )
    if( j/3 == 0 )
        System.out.print( j + "\t" );
```

Outputs:

Q#5 Trace this matrix code and determine what it outputs.

```java
char [][] charMat = new char[7][7];
for( int i=0 ; i<charMat.length ; i++ )
    for( int j=0 ; j<charMat[i].length ; j++ )
    {   if( i==charMat.length/2 || j==charMat[i].length/2 ||
            i == j || i+j == charMat.length-1 )
            charMat[i][j] = '*';
        else
            charMat[i][j] = ' ';
    }
for( int i=0 ; i<charMat.length ; i++ )
{   for( int j=0 ; j<charMat[i].length ; j++ )
        System.out.print( charMat[i][j] );
    System.out.println();
} // Outputs:
```

Q#6

a) What does it mean to overload a method?

b) How does the compiler resolve the overloads (tell them apart)?

Q#7

a) Assume int x=3;

expr => (x/10)   evaluates to: _____

expr =>(x/2.0)   evaluates to: _____

expr=> (x + 5 * 4 + 3 / 2)   evaluates to: _____

b) Assume **boolean b1 = true, b2 = false; int i = 100, j = -4;**

    b1 || (j>0) || (b2 && i==100) evaluates to: _____

    b1 && (b2 || i>j) && (b1 != b2) evaluates to: _____

    (b2 || !b2)   evaluates to: _____

c) Go back to (b) and circle the operators that short circuit

d) Write INVALID after any of the following statements if they are invalid

   Assume: **String s1,s2; int i,j ; double d1,d2;**

    s1 = "Hello World";

    s2 = "3" + "14159";

    s1 = 3.14159;

    d1 = s2;

e)   Assume these definitions:

```
int i = 9; boolean boolean b;
```

then trace this code

```
if (i>0)
{
    b = (1 % 2) != 0;
    i = i % 2;
}
else
{
    i = i + (i%2);
    b = false;
}

if (i%2 ==0 )
{
    if (i>0)
    {
        i = 7;
        b = true;
    }
}
else
{
    if (b)
        i = 9 - (i%5);
    else
        b = (i%2) != 0 ;
}
```

What are the final values of b and i ?

Q#8 What is the output of this code segment?

```
boolean inputOk = true;

if (inputOk)
    System.out.println("Thank you");
    System.out.println("Your Input was OK");

if (!inputOk)
    System.out.println("Sorry - try again you");
    System.out.println("Your Input was bad");
```

Q#9 What is the output of this code segment?

After each of the description, write "FOR","WHILE" or "DO"
to indicate which loop form is best suited for the task.

Assume you must use a loop to do the given task

a) Prompt a user for a number in a desired range until they get
it right

b) Calculate the sum of all the numbers from 1 to 100

c) Divide a given number by 2 until the number reaches 1.

Q#10 Write a method that that receives an int and returns it as
a String

Q#11 What's wrong with this code?

```
int[] x = null;
x = new String[5];
for (int i = 0; i < x.length; i++)
    System.out.println(x[i]);
```

Q#12 What's wrong with this code?

```
public static void main(String[] args)
{
    int x = 5;
    System.out.println(multiply(x,5));
}
public static int multiply(int num1, int y)
{
    return (x * y);
}
```

Q#13 What's wrong with this code?

```
int[] x = null;
x = new int[10];
for (int i = 0; i < x.length; x = null)
{
    // do whatever
}
```

Q#14   What's wrong with this code?

```
int[] x = null;
x = new int[10];
for (int i = 0; i <= x.length; ++i)
{
    x[i] = i;
}
```

Q#15   What's the output of this program?

```
public static void main(String[] args)
{
    int[] arr = new int[10];
    fillArray(arr);
    System.out.print(arr[t] + " ");
}
static void fillArray(int[] arr)
{
    arr = new int[5];
    for (int i = 0; i < arr.length; i++)
        arr[i] = i * 2;
}
```