**Question 1.** Rewrite this while-loop as a for-loop. The variable “total” should have the same value at the end:

```java
int i = 1;
int total = 0;
while( i < 100 )
{
    total += i;
    i++;
}
```

**Question 2.** Enter a random sentence and display the number of vowels. (Assume the vowels are: a, e, i, o and u).

**Sample output**
Enter a sentence:
I like bananas
6 vowels

**Question 3.** Write a short Java program that will use nested for loops to print out all the values for a 10 x 10 multiplication table. Each entry in the table must be calculated as the product of two variables and output from within the loop (do NOT simply write out character strings!).

**Sample output**

```
1  2  3  4  5  6  7  8  9 10  
2  4  6  8 10 12 14 16 18 20  
3  6  9 12 15 18 21 24 27 30  
4  8 12 16 20 24 28 32 36 40  
5 10 15 20 25 30 35 40 45 50  
6 12 18 24 30 36 42 48 54 60  
7 14 21 28 35 42 49 56 63 70  
8 16 24 32 40 48 58 64 72 80  
9 18 27 36 45 54 63 72 81 90  
10 20 30 40 50 60 70 80 90 100
```

**Question 4.** Find the square root by using the iterative Babylonian square root method (see: 6:25 to 7:25 in [https://www.youtube.com/watch?v=csInNn6pFT4](https://www.youtube.com/watch?v=csInNn6pFT4)). This is done by repeated updating the following equation:

\[
\text{newGuess} = \frac{\text{oldGuess}+n/\text{oldGuess}}{2}
\]

... where n is the number we are trying to find the square root of and the initial guess can be anything (greater than zero).
Stop computing new guesses when the value ceases to change.

**Sample output**

Square root of what number?
29
Current guess = 8.25
Current guess = 5.882575757575758
Current guess = 5.406194511112412
Current guess = 5.385205709145012
Current guess = 5.385164807289835
Square root = 5.385164807289835

**Question 5.** Write a program that reads in a sentence, then finds the Nth instance of a pattern. The String class (*Hint* *Hint*) has an indexOf() and lastIndexOf() methods which find the first and last instance of this pattern.

**Sample output**
Enter sentence:
i like bananas
Enter pattern:
a
Enter N:
2
Starts at index 10

**Sample output**
Enter sentence:
i like bananas
Enter pattern:
a
Enter N:
1
Starts at index 8

**Sample output**
Enter sentence:
i like bananas
Enter pattern:
a
Enter N:
99
Starts at index -1