CS-141 Basic Looping Problems

The following are a list of loops that a programmer ought to be able to do without much effort:

1. Write a for-loop that prints the integers from a to b. Repeat using a while-loop instead of a for-loop.

```
int a = 5;
int b = 10;
for (int i = a; i <= b; i++) {
     System.out.println("i = " + i);
}

int i=a;
while (i <= b) {
     System.out.println("i = " + i);
     i++;
}
```

2. Write a for-loop that prints every other integer from a to b. Repeat using a while-loop.

```
int a = 5;
int b = 10;
for (int i = a; i <= b; i=i+2) {
     System.out.println("i = " + i);
}

int i=a;
while (i <= b) {
     System.out.println("i = " + i);
     i=i+2;
}
```

3. Write a for-loop that prints the integers from a to b backwards. Repeat using a while-loop.

```
int a = 5;
int b = 10;
for (int i = b; i >= a; i--) {
    System.out.println("i = " + i);
}

int i=b;
while (i >= a) {
    System.out.println("i = " + i);
    i--;
}
```

4. Write a for-loop that sums the integers from a to b. Repeat using a while-loop.

```
int a = 5;
int b = 10;
int sum = 0;
for (int i = a; i <= b; i++) {
    sum = sum + i;
}
System.out.println("sum = " + sum);
```

```
int i=a;
sum = 0;
while (i <= b) {
    sum = sum + i;
    i++;
}
System.out.println("sum = " + sum);
```

5. Write a for-loop that computes the average of n random numbers. Repeat using a while-loop.

```
int n = 10;
double sum = 0;
for (int i = 0; i< n; i++) {
    double r = Math.random();
    sum  = sum + r;
}
System.out.println("sum = " + sum);
System.out.println("ave = " + sum/n);

n = 10;
sum = 0;
int i = 0;
while (i < n) {
    double r = Math.random();
    sum += r;
    i++;
}
System.out.println("sum = " + sum);
System.out.println("ave = " + sum/n);
```

6. Write a while-loop that prompts the user for a sequence of numbers, stopping when the user enters a sentinel value.

```
Scanner in = new Scanner(System.in);
int value;
do {
    System.out.print("Please enter a positive integer. "
            + "(When done, enter -1): ");
    value = in.nextInt();
    System.out.println("You entered: " + value);
} while (value >=0);
System.out.println("Done.");
```

7. Write a while-loop that prompts the user for a sequence of numbers and determines the maximum (or minimum) value that has been entered.

```
int value;
int max = 0;
do {
    System.out.print("Please enter a positive integer. "
            + "(When done, enter -1): ");
    value = in.nextInt();
    if (value > max) max = value;
    System.out.println("You entered: " + value);
} while (value >=0);
System.out.println("max = "+ max);
```

8. Write a while-loop that prompts the user for a sequence of numbers and determines how many of the numbers are in a specified range, e.g. between 10 and 100.

```
int value;
int cnt = 0;
do {
    System.out.print("Please enter a positive integer. "
            + "(When done, enter -1): ");
    value = in.nextInt();
    if (value >10 && value <100) cnt++;
    System.out.println("You entered: " + value);
} while (value >=0);
System.out.println("The number between 10 and 100 are: "+ cnt);
```

9. Write a while-loop that prompts a user for an answer (e.g. yes or no) and keeps repeating the prompt if the user doesn't enter one of the allowed options. Repeat using a do-while loop.

```
See lab
```

10. Write a for-loop that prompts the user for a word and counts the number of occurrences of a given letter.

```
System.out.print("Please enter a word: ");
String w = in.nextLine();
System.out.println("You entered: " + w);
char letter = 'a';
int cnt = 0;
for (int i = 0; i < w.length();i++) {
    char c = w.charAt(i);
    if (c == letter) cnt++;
}
System.out.println("There are " + cnt +
     " occurrences of the letter " + letter);
```