Homework 3

CP119L

1. (exercise 4.6a in the textbook, p.182)
   Completed program and use // to write your annotation of the statement.

4.6 State which values of the control variable x are printed by each of the following for statements:

a)
```
for (x = 20; x >= 3; x -= 3) {
   printf("%u\n", x);
}
```
b)
```
for (x = 7; x <= 27; x += 5) {
   printf("%u\n", x);
}
```
c)
```
for (x = 2; x <= 20; x += 4) {
   printf("%u\n", x);
}
```
d)
```
for (x = 30; x >= 15; x -= 6) {
   printf("%u\n", x);
}
```
e)
```
for (x = 22; x >= 2; x -= 5) {
   printf("%d\n", x);
}
```

2. Print the integers from 1 to 100 using a for-loop and the counter variable n. Print only ten integers per line, with each number in a field width of 4 characters. [Hint: Use the calculation n % 10. When the value of this is 0, print a newline character.]

3. (exercise 4.8 in the textbook, p.183)
   Briefly describe what the program does by using // as the annotation at the end of the code. E.g. // this program can ……

4.8 What does the following program do?

```
#include <stdio.h>
int main(void)
{
   int x, i, j;
   // prompt user for input
   printf("%s", "Enter an integer in the range 1-20:");
   scanf("%d", &x); // read values for x
   for (i = 1; i <= x; i++) { // count from 1 to x
      for (j = 1; j <= x; j++) { // count from 1 to x
         if (j==i)
            printf("%c", '@'); // output @
         else
            printf(" ");
      } // end inner for
      printf("\n");
   } // end outer for
} // end of main
```

4. (exercise 4.9 in the textbook, p.183) (Use the for iteration)

4.9 ***(Sum and Average of Integers)*** Write a program to sum a sequence of integers and calculate their average. Assume that the first integer read with `scanf` specifies the number of values to be entered. Your program should read only one value each time `scanf` is executed. A typical input sequence might be

```
7 678 234 315 489 536 456 367
```

where the `7` indicates that the subsequent `7` values are to be summed.

5. (exercise 4.10 in the textbook, p.183) (Use the for iteration) The C column is 30, 31, 32, …, 50. The two columns require headers "C", "F", and C column in a field width of 5 characters, and F column in a field width of 10 characters. The F column requires a precision of 2 after the decimal point.

4.10 ***(Conversion Celsius to Fahrenheit)*** Write a program that converts temperatures from 30°C to 50°C to the Fahrenheit scale. The program should print a table displaying temperatures in the two scales side by side. [*Hint*: $°F = \frac{9}{5}C + 32$]

6. (exercise 4.11 in the textbook, p.183) (Use the for iteration)

4.11 ***(Calculating the Sum of Multiples)*** Write a program to calculate and print the sum of all multiples of 7 from 1 to 100.

7. (bonus)(exercise 4.26 in the textbook, p.186)

4.26 ***(Calculating the Value of π)*** Calculate the value of π from the infinite series

$$\pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \cdots$$

Print a table that shows the value of π approximated by one term of this series, by two terms, by three terms, and so on. How many terms of this series do you have to use before you first get 3.14? 3.141? 3.1415? 3.14159?