MIDDLE EAST TECHNICAL UNIVERSITY, NORTHERN CYPRUS CAMPUS
CNG140 C Programming – Worksheet 6

Purpose:
In this work sheet, you will familiarize yourself with while/for/do-while loops,

Tasks:

a. Write a program using a **loop** to print out the following sequence exactly, including commas:

Sample Run:
```
10, 9, 8, 7, 6,
5, 4, 3, 2, 1
```

b. It is important to write efficient program with a correct algorithm. Write a program using a **loop** to add integers from 1 to n with n equal to 1000. Verify the result using the formula n(n+1)/2 for the sum of integers from 1 to n, which is more efficient than using loops.

Sample Run:
```
Sum of numbers between 1 and 1000 = 500500
```

c. Write a program that calculates and prints the average of several integers. Assume that the last value to read with scanf() is sentinel number 9999.

Sample Run:
```
Enter integers, 9999 to stop: 10
Enter integers, 9999 to stop: 8
Enter integers, 9999 to stop: 11
Enter integers, 9999 to stop: 7
Enter integers, 9999 to stop: 9
Enter integers, 9999 to stop: 9999
Sum is 45
Average is 9.00
```

d. Write a program with first **while** loop and then **for** loop that computes the value of f(x) for x in the range of 0<=x<=5 with an increment of 0.5:

$$f(x) = 2x\sin(x) + \cos(x) + \frac{4x+3}{3x^2+2x+4}$$

Your program needs to create a table which shows the value of f(x) for x values:

x	**f(x)**
0.0	?
0.5	?
….	…
5.0	?

e. Write a C program that converts a decimal number into its binary representation.
Sample Run:
```
Enter a number: 44
The binary representation for 44 is: 101100
```

f. Write a C program that prints the digits of the decimal representation of an integer value in reverse order, i.e. the digits will be printed from least to most significant digit. Hint: Use a do-while loop that repeatedly divides the number by 10, stopping when it reaches zero.
Sample Run:
```
Enter a number: 934
The reverse of your 934 is: 439
```

g. Write a program that prompts the user to enter a number n, then prints all even squares between 1 and n. For example, if the user enters 100, then the program displays the following:

Sample Run:

```
Please enter n: 100
Even squares are:
4
16
36
64
100
```

h. Patients arrive at the hospital every day for an examination. Assume that the hospital has 10 doctors ((2: dermatologist (d), 3: heart surgeon (h), 5:pediatrician (p)). Each doctor can treat only one patient per day. The hospital makes calculations and counts the number of untreated patients and treated ones at the end of every day. Write a C program, that gets the requested code for a doctor and then counts of treated and untreated patients for one day. Assume that the number of patients is not known.
Sample Run:

```
Type (d: dermatologist, h: heart surgeon, p: pediatrician, x: exit): p
Pediatrician 1 treats patient 1
Type (d: dermatologist, h: heart surgeon, p: pediatrician, x: exit): d
Dermatologist 1 treats patient 2
Type (d: dermatologist, h: heart surgeon, p: pediatrician, x: exit): h
Heart surgeon 1 treats patient 3
Type (d: dermatologist, h: heart surgeon, p: pediatrician, x: exit): d
Dermatologist 2 treats patient 4
Type (d: dermatologist, h: heart surgeon, p: pediatrician, x: exit): d
Patient 5 untreated!
Type (d: dermatologist, h: heart surgeon, p: pediatrician, x: exit): h
Heart surgeon 2 treats patient 6
Type (d: dermatologist, h: heart surgeon, p: pediatrician, x: exit): x
5 patients treated, 1 patient not treated!
```

i. Assume that user enters N integers in the range of [1.....1000]. Among these integers, some percentage (perc1) are divisible by 2, percentage (perc2) are divisible by 3, percentage (perc3) are divisible by 4. Write a program that calculates and prints the perc1, perc2, perc3 among the given number of integers.

Sample Run:

```
How many numbers would you like to enter? 10
Enter number: 100
Enter number: 25
Enter number: 12
Enter number: 9
Enter number: 150
Enter number: 64
Enter number: 98
Enter number: 44
Enter number: 900
Enter number: 825
Perc1 is 70% Perc2 is 50% and Perc3 is 50%
```

Recommended Reading:
Chapter 5

Recommended Exercises:
All practical exercises in Chapter 5.