Programming – TU856/1 & TU858/1

Lab 3 – Tuesday, October 18th, 2022

Note: You are expected to finish all programmes in your own time if you do not get these done during the lab session. This is your own responsibility.

Keyboard Input (i.e. Standard Input)

NB: You **must** use comments, white-space and indent your code for **all questions**

Write separate programs to do the following:

1. Ask the user to enter 3 numbers and display these on separate lines.

2. Ask the user to enter 2 characters. Display these on the screen. Change your code and see what happens if you use %d as the delimiter for displaying these letters.

   Q: What happens if you press the Space key or hit Enter twice when entering a letter?

   Change your code and use %1s instead of %c in your *scanf()*. Does this fix the problem? Try.

3. Ask the user to enter 3 float numbers (numbers with a decimal part). Display the 1st correct to 4 decimal places, the 2nd correct to 3 decimal places, and the 3rd with no decimal places on separate lines.

4. Write separate programs for each of the following from the scanned images below:

   Q2, Q3, Q4, Q5, Q6, Q8 (be careful with your use of brackets with Q6) – see below

   (Remember to save your files with a .c extension (e.g. Lab3Q2.c, Lab3Q3.c, etc.,)

Quick syntax reference

	Syntax	Examples

Input data from the keyboard	`scanf(format,&variables) ;`	`char grade ;`
		`int age ;`
		`scanf("%c %d",&grade,&age) ;`

Input a single character from the keyboard	`variable=getchar() ;`	`char_in=getchar() ;`
Output a single character to the screen	`putchar(variable) ;`	`putchar(char_out) ;`

Exercises

1. What is wrong with this program?

```
#include <stdio.h>
main()
{
int num;
printf( "Please type a number followed by Enter" ) ;
scanf( "%f", num ) ;
printf( "The number you typed was: %d", num ) ;
}
```

2. Write a single `scanf()` statement to input values from the keyboard for each of the following:

```
(a) int first ;
(b) int second, third, fourth ;
(c) float principal, rate, time ;
(d) char keyval1, keyval2 ;
(e) char c ;
    int i ;
    float f ;
    double d ;
```

3. Write a program to input four numbers and display them in reverse order.

4. Suppose that `v1`, `v2` and `v3` are three floating-point variables with values 5.0, –4.5, and 11.25, respectively. Write a `printf()` statement to display this message:

```
v1 = 5   v2 = -4.5   v3 = 11.25
```

5. Assuming the human heart rate is seventy-five beats per minute, write a program to ask a user their age in years and to calculate the number of beats their heart has made so far in their life.

6. Write a program to accept a temperature in degrees Fahrenheit and convert it to degrees Celsius. Your program should display the following prompt:

```
Enter a temperature in degrees Fahrenheit:
```

You will then enter a decimal number followed by the Enter key.
The program will then convert the temperature by using the formula

Celsius = (Fahrenheit – 32.0) * (5.0 / 9.0)

Your program should then display the temperature in degrees Celsius using an appropriate message.

7. Make changes to the program developed in exercise 6 to accept the temperature in degrees Celsius and convert it to degrees Fahrenheit.

8. Write a program to input three floating-point numbers from the keyboard and to calculate

(a) their sum and
(b) their average.

Display the results to three decimal places.

9. Write a program to input two integers from the keyboard and display the first number as a percentage of the second number.
Display the percentage value with one decimal place.
For example, assuming that the numbers input are 5 and 40, your output should look like this:

```
5 is 12.5 percent of 40
```

10. Write a program to read in two numbers from the keyboard and to display the result of dividing the second number into the first.

For example, if you input 123 and 12, display the results in the following format:

```
      10 Remainder = 3
    ----
12 ) 123
```

(Hint: use the modulus operator % to get the remainder 3, and use integer division to get the quotient 123.)