Programming – TU856/1 & TU858/1

Lab 4 – Tuesday, October 25th, 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.

Conditional Statements (if, if…else, switch)

Remember: The file names for all your C program files should be approx. 10 characters or less (no spaces allowed).

All programs **must** contain:

- Program description at start of program
- Comments throughout the code
- White space
- Indentation

Please adhere to this correct coding standard.

Write separate programs to:

1. Using a *switch* statement, write a program that asks the user to enter a character from the keyboard and displays a message whether the character is a vowel (a, e, i, o, u) or not.

2. Write a program that asks the user to enter an integer between 1 and 100. Check whether the integer is even or odd and print a message on the screen stating "Number x is Even" or "Number y is Odd".

3. Write separate programs for each of the following:

   Q1, Q3, Q5, Q6, Q7 (below)

(Remember to save your files with a .c extension (i.e., Lab4Q1.c, Lab4Q2.c, etc.,)

Quick syntax reference

	Syntax	Examples

if-else	`if (condition)`
	`{`
	`  Statement(s) ;`
	`}`
	`else`
	`{`
	`  Statement(s) ;`
	`}`
		`if ( n > 0 )`
		`{`
		`  average = total / n ;`
		`  printf("%5.2f",average) ;`
		`}`
		`else`
		`  average = 0 ;`

?:	`variable=(condition)?v1:v2 ;`	`max = (n1>n2) ? n1:n2 ;`

switch	`switch (expression)`
	`{`
	`case value1 :`
	`  statement(s) ;`
	`  break ;`
	`case value2 :`
	`  statement(s) ;`
	`  break ;`
	`default :`
	`  statement(s) ;`
	`}`
		`char traffic_light ;`
		`...`
		`switch(traffic_light)`
		`{`
		`case 'R':`
		`case 'r':`
		`  printf("Red: STOP") ;`
		`  break ;`
		`case 'G':`
		`case 'g':`
		`  printf("Green: GO") ;`
		`  break ;`
		`case 'A':`
		`case 'a':`
		`  printf("Amber: READY") ;`
		`  break ;`
		`default:`
		`  printf("FAULT") ;`
		`}`

Exercises

1. Rewrite the following `if-else` using a `switch` statement:

```
if ( marriage_status == 'S' )
   printf( "single" ) ;
else if ( marriage_status == 'M' )
   printf( "married" ) ;
else if ( marriage_status == 'W' )
   printf( "widowed" ) ;
else if ( marriage_status == 'E' )
   printf( "separated" ) ;
else if ( marriage_status == 'D' )
   printf( "divorced" ) ;
else
   printf( "error:invalid code" ) ;
```

2. The following program segment displays an appropriate message depending on the values of three integers: n1, n2, and n3.

```
if ( n1== n2 )
  if ( n1 == n3 )
    printf ( "n1, n2 and n3 have the same value\n" ) ;
  else
    printf ( "n1 and n2 have the same value\n" ) ;
else if ( n1 == n3 )
       printf ( "n1 and n3 have the same value\n" ) ;
     else if ( n2 == n3 )
            printf ( "n2 and n3 have the same value" ) ;
          else
            printf ( "n1, n2 and n3 have different values" ) ;
```

To test the various branches in this code you will need to construct five sets of test data, each set testing one of the branches. Construct the five sets of test data for n1, n2, and n3.

3. Write a program to read in two integers and check if the first integer is evenly divisible by the second. (Hint: use the modulus operator %.)

4. Input two numbers and find the smaller of the two using the conditional operator ?

5. In a triangle, the sum of any two sides must be greater than the third side. Write a program to input three numbers and determine if they form a valid triangle.

6. Write a program that reads a single numeral from the keyboard and displays its value as a word. For example, an input of 5 will display the word 'five'.

7. Write a program to input a number 1 to 7 from the keyboard, where 1 represents Sunday, 2 Monday, 3 Tuesday, etc. Display the day of the week corresponding to the number typed by the user. If the user types a number outside the range 1 to 7, display an error message.

8. Add the increment operator (I or i) and the decrement operator (D or d) to the simple calculator program P5F.

9. Write a program to input the time of day in Ireland and display the equivalent time in Washington (– 5 hours), Moscow (+ 3 hours), and Beijing (+ 7 hours). Input the time in the 24-hour format, e.g. 22:35 (10:35 p.m.).

10. Write a program to display the effects of an earthquake based on a Richter scale value input from the keyboard. The effects corresponding to a Richter scale value is as follows:

Richter scale value	*Effects*
Less than 4	Little.
4.0 to 4.9	Windows shake.
5.0 to 5.9	Walls crack; poorly built buildings are damaged.
6.0 to 6.9	Chimneys tumble; ordinary buildings are damaged.
7.0 to 7.9	Underground pipes break; well-built buildings are damaged.
More than 7.9	Ground rises and falls in waves; most buildings are destroyed.