LAB 6: INPUT & OUTPUT

OBJECTIVES FOR THE STUDENT

1.   To read user input from keyboard and display program output.
        [*Untuk membaca masukan pengguna daripada papan kekunci dan memaparkan hasil aturcara.*]

2.   To write simple programs that read numbers and text, process the input and display the results.
        [*Untuk menulis sebuah aturcara mudah yang dapat membaca nombor-nombor dan teks, memproses data masukan dan memaparkan hasil-hasil proses tersebu.*]

3.   To format output.
        [*Untuk memformat output.*]

ASSUMPTIONS

1.   Students have experience in compiling and running a C program.
        [*Pelajar mempunyai pengalaman mengkompil dan melaksanakan aturcara C.*]

2.   Students have a basic knowledge of previous lessons (Data Types and Arithmetic).
        [*Pelajar mempunyai pengetahuan asas tentang pelajaran yang terdahulu (Jenis Data dan Aritmetik).*]

LAB EXERCISES

EXERCISE 1:
[*LATIHAN 1*]

1.   Write a C statement that performs the following operations:
        [*Tulis penyataan C yang menjalankan operasi-operasi berikut*]

        i.   Declare variables; `weight` and `height` of float type.
                [*Istiharkan pembolehubah; `weight` dan `height` berjenis float.*]

        ii.   Declare a `counter` of type integer with an initial value of 0.
                [*Istiharkan pembolehubah `counter` berjenis integer dengan nilai awalan 0.*]

        iii.   Stores the value 180.5 to the variable.

[*Simpan nilai 180.5 kepada pembolehubah* `weight`.]

iv. Add a value of 1 to the `counter` variable and store the result to the counter variable.
[*Tambah nilai 1 dalam pembolehubah* `counter` *dan simpan hasil dalam pembolehubah* `counter`.]

v. Declare variables; `weight_reduced` and `new_weight` of floating type.
[*Istiharkan pembolehubah;* `weight_reduced` *dan* `new_weight` *berjenis float*.]

vi. Read the `weight_reduced` variable from a keyboard.
[*Baca pembolehubah* `weight_reduced` *daripada papan kekunci*.]

vii. Calculate the value of `new_weight` as a difference between the weight and the weight_reduced values.
[*Kira nilai* `new_weight` *sebagai perbezaan di antara nilai* `weight` *dan* `weight_reduced` .]

viii. Display the value of `new_weight` on the screen.
[*Paparkan nilai* `new_weight` *pada skrin*.]

ix. Display the statement; "Congratulations! You have reduced your weight" on the screen.
[*Paparkan pernyataan, "Congratulations! You have reduced your weight" pada skrin*.]

EXERCISE 2:
[*LATIHAN 2*]

1. Type in the following 2 programs (Program 6.1 and Program 6.2):
[*Taip 2 aturcara berikut (Program 6.1 dan Program 6.2):*]

```
1   //Program 6.1
2   #include <stdio.h>
3   #include <conio.h>
4
5   int main ()
6   {
7     char  char1;
8     char  char2;
9     char  char3;
10    char  char4;
11    printf("Input four characters > ");
12    scanf  ("%c%c%c%c",  &char1,  &char2,  &char3,
13  &char4);
14    printf("%c  %c  %c  %c",  char1,  char2,  char3,
15  char4);
```

```
16        getch();
17        return 0;
18   }
```

```
1    //Program 6.2
2    #include <stdio.h>
3    #include <conio.h>
4
5    int main ()
6    {
7        char  char1;
8        char  char2;
9        char  char3;
10       char  char4;
11       printf("Input four characters > ");
12       char1=getchar();
13       char2=getchar();
14       char3=getchar();
15       char4=getchar();
16       putchar(char1);
17       putchar(char2);
18       putchar(char3);
19       putchar(char4);
20       getch();
21       return 0;
22   }
```

2.   Compile and run them with the same set of the input data. e.g. (a b c d).
        Examine the results carefully.
        [*Kompil dan laksanakan aturcara-aturcara tersebut dengan set data input
        yang sama (contoh a b c d). Semak hasil tersebut secara teliti.*]

3.   Understand what each line of the statement in the program does. In your own
        words, explain what the program does and the difference between the two
        programs.
        [*Fahamkan apa yang dilakukan oleh setiap baris di pernyataan dalam
        aturcara tersebut. Di dalam ayat kamu sendiri, terangkan apa yang dilakukan
        oleh setiap aturcara tersebut lakukan dan perbezaan di antara kedua-dua
        aturcara tersebut.*]

EXERCISE 3:
[*LATIHAN 3*]

1.   Write a C program that asks the user to enter an integer, a floating point
        number, and a character, and write the results back out. All output must be
        must be in the format shown in the sample output.
        [*Tulis satu aturcara C yang meminta pengguna memasukkan satu nilai integer,
        satu nilai titik terapung dan satu aksara, dan paparkan semula nilai-nilai*

yang telah dimasukkan. Semua hasil mestilah dicetak menggunakan format seperti contoh output di bawah.]

Sample input:
```
Enter an integer: 7
Enter a decimal number: 2.25
Enter a single character: r
```

Sample output:
```
You entered 7
You entered 2.25
You entered r
```

2.   Write a C program that will read your yearly gross wage from a keyboard, calculate and display your monthly net wage. Assuming your yearly gross wage is between RM50,000 and RM80,000. Below are the deductions that need to be considered:

i.   Yearly income tax: 10% from the gross wage.
ii.   CPF: 8% from the first RM45000 of the gross wage and 4% from the rest.

[*Tulis satu aturcara C yang akan membaca gaji kasar setahun daripada papan kekunci, mengira dan memaparkan pendapatan bersih sebulan. Anggapkan yang gaji kasar anda setahun ialah di antara RM50,000 dan RM80,000. Berikut ialah potongan yang perlu dibuat:*

i.   *Cukai pendapatan setahun: 10% daripada gaji kasar.*
ii.   *CPF: 8% daripada RM45000 yang pertama daripada gaji kasar dan 4% selebihnya.]*

EXERCISE 4:
[*LATIHAN 4*]

1.   Type in Program 6.3 as follows:
     [*Taip Program 6.3 seperti berikut:*]

```
1    //Program 6.3
2    #include <stdio.h>
3
4    int main()
5    {
6
7        float val1, val2, val3, val4;
8        FILE *inData;
9        FILE *outData;
10
11       inData = fopen("DataIn.txt", "r");
12       outData = fopen("DataOut.txt", "w");
13
```

```
14        fscanf(inData,"%f%f%f%f", &val1, &val2,
15            &val3, &val4);
16        fprintf(outData,"%f %f %f %f", val1, val2,
17            val3, val4);
18
19        return 0;
20    }
```

2. Create the input data file DataIn.txt. The file consists of the following data:
[*Cipta satu fail input DataIn.txt. Fail tersebut mengandungi data-data berikut:*]

```
5.5
6.6
7.7
8.8
```

3. Compile and run Program 6.3. Examine the results carefully. Understand what each line of the statement in the program does. In your own words, explain what the program does.
[*Kompil dan laksanakan Program 6.3. Kaji hasil nya dengan teliti. Fahamkan apa yang dilakukan oleh setiap baris pernyataan di dalam aturcara tersebut. Di dalam ayat kamu sendiri, terangkan apa yang aturcara tersebut laksanakan.*]

4. Modify the program so it also outputs the average of the four input numbers.
[*Ubahsuai Program 6.3 aturcara tersebut supaya ia menghasilkan purata keempat-empat nombor tersebut.*]

EXERCISE 5:
[*LATIHAN 5*]

1. Type in Program 6.4 as follows:
[*Taip Program 6.4 seperti berikut:*]

```
1    //Program 6.4
2    #include <stdio.h>
3    #include <conio.h>
4    int main()
5    {
6        int n;
7        float f;
8        char s[100];
9
10       printf("Input one integer: ");
11       scanf("%d", &n);
12
13       printf("%d\n%6d\n%-6dend\n", n, n, n, n);
14
```

```
15          printf("Input one string: ");
16          scanf("%s", s);
17          printf("%s\n%20s\n%-20send\n", s,s,s);
18
19
20          printf("Input one floating number: ");
21          scanf("%f", &f);
22          printf("%f\n%5.2f\n%-10.2eend\n", f, f, f);
23
24          getch();
25          return 0;
26    }
```

2. Compile and run Program 6.4. Examine the results carefully. Understand what each line of the statement in the program does. In your own words, explain what the program does.
    [*Kompil dan laksanakan Program 6.4. Periksa hasilnya dengan teliti. Fahamkan apa yang dilakukan oleh setiap baris arahan di dalam aturcara tersebut lakukan. Di dalam ayat kamu sendiri, terangkan apa yang dilakukan oleh aturcara tersebut.*]

EXERCISE 6:
[*LATIHAN 6*]

1. Write a program that will convert Malaysian Ringgit (RM) amounts to Japanese Yen and to Euros. The conversion factors to use are:
        1 RM = 0.21734 Euros
        1 RM = 36.0665 Yen

    Format your currency amounts in fixed-point notation, with two decimal places of precision, and be sure the decimal point is always displayed.
    [*Tulis satu aturcara yang akan menukarkan nilai Ringgit Malaysia (RM) ke Yen Jepun dan Euros. Nilai penukaran adalah seperti berikut:*
        1 RM = 0.21734 Euros
        1 RM = 36.0665 Yen

    Nilai matawang tersebut mestilah berjenis titik terapung, dengan dua tempat perpuluhan. Pastikan titik perpuluhan tersebut dipaparkan.]

2. The monthly payment on a loan may be calculated by the following formula:
    [*Bayaran bulanan untuk sebuah pinjaman boleh dikira dengan menggunakan rumus berikut:*]

$$\text{Payment} = \frac{\text{Rate} * (1+\text{Rate})^N}{((1+\text{Rate})^N - 1)} * L$$

Rate is the monthly interest rate, which is the annual interest rate divided by 12 (e.g. 12% annual interest would be 1 percent monthly interest). N is the number of payments and L is the amount of the loan. Write a program that asks for these values and displays a report as follows:

[*Rate merujuk kepada kadar interest bulanan, iaitu kadar interest tahunan dibahagi dengan 12 (contohnya, kadar interest bulanan untuk 12% kadar interest tahunan ialah 1%). N ialah bilangan pembayaran dan L ialah jumlah pinjaman. Tulis satu aturcara yang akan membaca nilai-nilai tersebut dan memaparkan report seperti format di bawah:*]

```
Loan Amount:                RM10000.00
Monthly Interest Rate:             1%
Number of Payments:                36
Monthly Payment:            RM  332.14
Amount Paid Back:           RM11957.15
Interest Paid:              RM 1957.15
```