LAB 5: WORKING WITH DATA

OBJECTIVES FOR STUDENTS

1.   Identify the difference between integer and floating-point numbers.
        [*Mengenal pasti perbezaan di antara nombor integer dan titik terapung.*]

2.   Write arithmetic expressions in C.
        [*Menulis ungkapan aritmetik dalam C.*]

3.   Define and initialize variables and constants in C.
        [*Mentakrifkan dan memberi nilai awal kepada pembolehubah dan pemalar di dalam C.*]

4.   Write simple programs that assign values to variables, process the values and display the results.
        [*Menulis satu aturcara yang mudah yang dapat mengumpukkan nilai kepada pembolehubah, memproses nilai-nilai tersebut dan memaparkan hasil operasi tersebut.*]

ASSUMPTIONS

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

LAB EXERCISES

EXERCISE 1:
[*LATIHAN 1*]

1.   Write assignment statements that perform the following operations with variables `a`, `b` and `c`.
        [*Tulis penyataan umpukan yang menjalankan operasi berikut terhadap pembolehubah a, b dan c.*]

        i.   Add 2 to variable `a` and stores the result in `b`.
                [*Tambah 2 kepada a dan simpan hasilnya dalam b.*]

        ii.   Multiply `b` with 4 and stores the result in `b`.
                [*Darab b dengan 4 dan simpan hasilnya dalam b.*]

iii.   Divide `a` by 3.14 and stores the result in `b`.
        [*Bahagi a dengan 3.14 dan simpan hasilnya dalam b.*]

iv.   Subtract 8 from b and stores the result in `a`.
        [*Tolak 8 daripada b dan simpan hasilnya dalam a.*]

v.   Store the value 27 in `a`.
        [*Simpan nilai 27 dalam a.*]

vi.   Store the character 'L' in `c`.
        [*Simpan huruf 'L' dalam c.*]

EXERCISE 2:
[*LATIHAN 2*]

1.   Download Program 5.1. There are a number of syntax errors in the Program
      5.1. Locate as many as you can.
      [*Muat turun Program 5.1. Terdapat beberapa ralat sintaks di dalam Program
      5.1. Kenalpasti sebanyak yang mungkin.*]

```
1    //Program 5.1
2    #include <stdio.h>
3    #include <conio.h>
4
5    int main()
6    {
7       int a,b;
8       a=3;
9       b=4;
10      c=a+b;
11      printf ("The value of c is %d, c)";
12      getch();
13      return 0;
14   }
```

2.   Explain and correct the errors.
      [*Berikan penerangan tentang ralat sintaks yang dikenal pasti dan betulkan
      ralat-ralat tersebut.*]

EXERCISE 3:
[*LATIHAN 3*]

1.   Type in the following program (Program 5.2):
        [*Taip aturcara yang berikut (Program 5.2)*:]

```
1    //Program 5.2
2    #include <stdio.h>
3    #include <conio.h>
4
5    int main()
6    {
7            int length, width, area;
8
9            length = 12;
10           width = 13;
11           area=length*width;
12           printf ("Area: %d", area, "\n");
13           getch();
14           return 0;
15   }
```

2.   Compile and run the Program 5.2. What is the output?
        [*Kompil dan laksanakan Program 5.2. Apakah hasilnya?*]

3.   In your own words, explain the program.
        [*Di dalam ayat kamu sendiri, berikan penerangan tentang aturcara tersebut.*]

4.   Now, modify the Program 5.2 by changing the value of length to 12.12 and
        width to 13.12. Compile and run the modified program. What is the output?
        Explain the output.
        [*Ubah aturcara di dalam Program 5.2 dengan menukarkan nilai length
        kepada 12.12 dan width kepada 13.12. Kompil dan laksanakan aturcara
        yang telah diubahsuai. Apakah hasilnya. Berikan penerangan tentang hasil
        tersebut.*]

5.   Now, change the length and width variable type to float. Compile and
        run the modified program. What is the output?
        [*Ubah pembolehubah length dan width kepada jenis float. Kompil dan
        laksanakan aturcara yang telah diubahsuai. Apakah hasilnya?*]

EXERCISE 4:
[*LATIHAN 4*]

1. What will be printed by the extracted code below. Explain how you get such output.
    [*Apakah yang akan dicetak oleh cebisan kod di bawah. Terangkan bagaimana kamu boleh mendapat hasil tersebut.*]

```
1    //Program 5.3
2
3      int n, m, x, y;
4      m=10;
5      n=m++*2;
6      printf ("n: %d", n);
7      printf ("\nm: %d", m);
8
9      x=10;
10     y=++x*2;
11     printf ("\nx:  %d", x);
12     printf ("\ny: %d", y);
```

2. What is the final value of t? Why such output? Explain the output.
    [*Apakah hasil akhir nilai t? Kenapa hasil tersebut dihasilkan? Berikan penerangan tentang hasil tersebut.*]

```
1    //Program 5.4
2
3    int j=2, k=3;
4    double r=24.5, s=3.0, t1, t2;
5
6    t1*=r+s;
7    t2=r-s*3%(2+j)/k;
```

EXERCISE 5:
[*LATIHAN 5*]

1. Convert the following pseudocode (Algorithm 5.1) to C code.
   [*Tukarkan kod sudo berikut (Algorithm 5.1) ke kod C.*]

```
Algorithm 5.1: Calculating total sales value for three
items

1. Start
2. Store 12.95 in the item1 variable.
3. Store 24.95 in the item2 variable.
4. Store 6.95 in the item3 variable.
5. Sum up the three variables and store the result in the
   subtotal variable.
6. Multiply the subtotal variable with 0.06 and store the
   result in the sales tax variable.
7. Subtract the sales tax amount from the subtotal and
   store the result in the total variable.
8. Display each item's value, the subtotal value, the
   amount of sales tax and the total.
9. End
```

2. Convert either Algorithm 2.1 or Algorithm 2.2 (Lab 2, Exercise 1, Question 2) to C code.
   [*Tukarkan samada Algorithm 2.1 atau Algorithm 2.2 (Lab 2, Exercise 1, Question 2) kepada kod C.*]

3. Convert the designed solution for "Get the input values" (Lab 2, Exercise 6, Question 1) to C code.
   [*Tukarkan penyelesaian yang telah direkabentuk bagi "Get the input values" (Lab 2, Exercise 6, Question 1) kepada kod C.*]

4. Convert the designed solution for "Calculate the total perimeter" (Lab 2, Exercise 6, Question 1) to C code.
   [*Tukarkan penyelesaian yang telah direkabentuk bagi "Calculate the total perimeter" (Lab 2, Exercise 6, Question 1) kepada kod C.*]

EXERCISE 6:
[*LATIHAN 6*]

1. Write a program that computes the tax and tip of a restaurant bill for a patron with a cost of RM50.60. The tax should be 10% of the meal cost. The tip should be 5% of the total after adding the tax. Display the cost, tax amount, tip amount and total bill on the screen.
    [*Tuliskan satu aturcara yang akan mengira nilai cukai dan tip untuk bil restoran yang mempunyai nilai kos RM50.60. Cukai ialah 10% daripada kos tersebut. Tip pula ialah 5% daripada jumlah kos setelah dicampur dengan cukai. Paparkan nilai kos, nilai cukai, nilai tip dan jumlah bil di skrin.*]

2. An electronics company sells circuit boards at a 40 percent profit. Write a program that will calculate the selling price of a circuit board that costs RM12.67. Display the result on the screen.
    [*Sebuah syarikat elektronik menjual papan litar pada keuntungan 40%. Tuliskan satu aturcara yang akan mengira harga jualan papan litar yang berkos RM12.67. Paparkan hasil di skrin.*]