

## Tutorial 1 – Basic C Programming and Control Flow

**Note:** You need to do some reading on the textbook in order to complete this tutorial.

1. State the data type of each of the following:

- |                  |                          |
|------------------|--------------------------|
| a. <b>'1'</b>    | g. <b>1870943465324L</b> |
| b. <b>23</b>     | h. <b>1.234F</b>         |
| c. <b>0.0</b>    | i. <b>-564</b>           |
| d. <b>'\040'</b> | j. <b>0177</b>           |
| e. <b>0x92</b>   | k. <b>0XfF4</b>          |
| f. <b>'\a'</b>   | l. <b>0xaaBB76L</b>      |

2. (a) What will the following program output? (refer to an ASCII table)  
(b) What will happen if the format specifier of the second printf is changed to **%d**?  
(c) What will be the result if **0x** in the third printf is removed?  
(d) What if the first **0** in the fourth printf is deleted?

```
#include <stdio.h>

int main()
{
    printf("%c", 'A');
    printf("%c", 65);
    printf("%c", 0x41);
    printf("%c", 0101);
    return 0;
}
```

3. Assume x and y are integer variables. What will happen if one of the following statements is executed?

- (a) **scanf("%d %d", &x, &y);**  
(b) **scanf("%d %d", x, y);**  
(c) **scanf("%d/%d", &x, &y);**

4. The output of the following code is not zero. Why?

```
{
    .....
    double A = 373737.0;
    double B;

    B = A * A * A + 0.37/A - A * A * A - 0.37/A;
    printf(" The value of B is %f.\n", B);
}
```

5. Given the following declarations and initial assignments:

```

int      i, j, m, n;
float    f, g;

```

```

i = j = 2;
m = n = 5;
f = 1.2;
g = 3.4;

```

evaluate the following expressions independently, i.e. all variables start with the same set of initial values. Show any conversions which take place and the type of result.

- |                           |                           |
|---------------------------|---------------------------|
| (a) <b>m * j / j</b>      | (b) <b>m / j * j</b>      |
| (c) <b>(f + 10) * 20</b>  | (d) <b>(i++) * n</b>      |
| (e) <b>i++ * n</b>        | (f) <b>-12L * (g - f)</b> |
| (g) <b>m = n = --j;</b>   | (h) <b>(int) g * 10</b>   |
| (i) <b>(int) (g * 10)</b> | (j) <b>j = i + f</b>      |

6. Which of the following are acceptable case constant expressions? Assume the convention that upper case is used for defining a constant, e.g.

```
#define      SVALUE      10
```

and other identifiers are variables.

- |                    |                    |
|--------------------|--------------------|
| (a) case 76:       | (b) case number*2: |
| (c) case SVALUE*2: | (d) case 80.1:     |

7. In some computer games it is necessary to introduce a delay to slow the computer down. Assume that you are running the following program on a computer which uses 16 bits to represent an integer. How can the delay be (a) shortened, (b) made a thousand times longer, (c) made variable after compilation?

```

#include <stdio.h>
#define DLENGTH 32000

int main()
{
    int count;
    .....
    for (count = -DLENGTH; count <= DLENGTH; count++)
        ; /* this is a NULL statement which does nothing */
    .....
}

```

8. Write a section of C program to interchange the values of two integer variables. Is there a way of solving this problem without using a third variable?