

Exercise 6

Control Flow. Loops

1. Launch Microsoft Visual Studio.
2. Create a new project.
3. Enter the source code that copies its input to its output one character at a time.

```
/* Copy input to output #1 */  
#include <stdio.h>  
int main()  
{  
    int ch;  
    printf ("Enter sequence of characters. For end press Ctrl/Z ");  
    ch = getchar ();  
    while (ch != EOF)  
    {  
        putchar (ch);  
        ch = getchar ();  
    }  
    return 0;  
}
```

4. Compile and run the program.
5. Change the code that copies its input to its output one character at a time as follows:

```
while ((ch = getchar ()) != EOF)  
{  
    putchar (ch);  
}
```

6. Compile and run the program.
7. Create a new project.
8. Write a program that counts characters.

```
/* Count characters in input */  
#include <stdio.h>  
int main()  
{  
    int nc; /* number of characters */  
    printf ("Enter sequence of characters. For end press Ctrl/Z ");  
    nc = 0;  
    while (getchar () != EOF)  
    {  
        ++nc;  
    }  
    printf ("Number of characters = %d\n", nc);  
    return 0;  
}
```

9. Compile and run the program.
10. Create a new project.

11. Write a program that counts input lines. Each line in the sequence of lines terminates by a newline.

```
/* Count lines in input */
#include <stdio.h>
int main()
{
    int ch,                                /* character */
        nl;                                /* number of lines */
    printf ("Enter sequence of lines. For end press Ctrl/Z ");
    nl = 0;
    while ((ch = getchar ()) != EOF)
    {
        if (ch == '\n')
            ++nl;
    }
    printf ("Number of lines = %d\n", nl);
    return 0;
}
```

12. Compile and run the program.

13. Write a program that counts lines, words, and characters. Word is any sequence of characters that does not contain a delimiter, i.e. white space (blank, tab or newline).

```
/* Count lines, words, and characters. */
#include <stdio.h>
#define IN 1                                /* inside a word */
#define OUT 0                               /* outside a word */
int main()
{
    int ch,                                /* character */
        nl,                                /* number of lines */
        nw,                                /* number of words */
        nc,                                /* number of characters */
        state;                            /* whether the program is currently in a word or not */
    printf ("Enter sequence of lines. For end press Ctrl/Z ");
    state = OUT;
    nl = nw = nc = 0;
    while ((ch = getchar ()) != EOF)
    { ++nc;
        if (ch == '\n')                    /* newline */
            ++nl;
        if (ch == ' ' || ch == '\n' || ch == '\t') /* delimiter */
            state = OUT;
        else if (state == OUT)            /* first character of a word */
        { state = IN;
            ++nw;
        }
    }
    printf ("Lines = %d\nWords = %d\nCharacters = %d\n", nl, nw, nc);
    return 0;
}
```

14. Compile and run the program.

15. Write a program that calculates the sum of a sequence of integers with a given number.

```
/* Calculate sum of a given number of integers */  
#include <stdio.h>  
int main()  
{  
    int n,                /* number of integers */  
        number,        /* integer number */  
        count,        /* counter */  
        sum;          /* sum of integers */  
    printf ("Enter number of integers: ");  
    scanf("%d", &n);  
    sum = 0;  
    for (count = 1; count <= n; count++)  
    {  
        printf ("Enter integer: ");  
        scanf("%d", &number);  
        sum += number;  
    }  
    printf("Sum of integers is %d.\n", sum);  
    return 0;  
}
```

16. Compile and run the program.