Computer Organization Project 4 – Booth's Multiplication

Due: 23:55, Apr. 25, 2019

In this project, you are required to perform a complete run of Booth's algorithm on two 16-bit signed numbers. The generation steps for the two numbers are described as follows.

1- Assume that the numerical part of your student ID is ***A***.
2- The square of ***A*** is ***B*** (***B*** = A^2). Use binary representation to represent ***B***.
3- Right shift ***B*** for 16 bits, take the lower 15 bits, and append an extra bit '0' to the most significant bit (MSB) to form a new 16-bit number ***C***. (i.e., ***C*** is a positive number.)
4- Right shift B for 16 bits, take the lower 15 bits, and append an extra bit '1' to the most significant bit (MSB) to form a new 16-bit number ***D***. (i.e., ***D*** is a negative number.)
5- Perform ***C***×***D*** by using the Booth's algorithm.

Please submit your Booth's multiplication result according to the following rules:
1- You are required to write every detailed step according to our lecture notes.
2- Upload your homework in TEXT format.
3- The filename is your student ID (e.g., B12345678.txt).

Example:

```
A = 12345678
B = 10001010100111110001111100011000011001111000100
C = 0000111110001100
D = 1000111110001100
C×D

Step              Product                 Next
   0   0000000000000000 1000111110001100 0   00 -> shift
   1   0000000000000000 0100011111000110 0   00 -> shift
   2   0000000000000000 0010001111100011 0   10 -> sub
   3  +1111000001110100
       1111000001110100 0010001111100011 0
       1111100000111010 0001000111110001 1   11 -> shift
                        ...
  14   0000001111000110 1101001001000010 0   00 -> shift
  15   0000000111100011 0110100100100001 0   10 -> sub
  16  +1111000001110100
       1111001001010111 0110100100100001 0
       1111100100101011 1011010010010000 1   done
 C×D = 1111100100101011 1011010010010000
```