CDA 3103

Programming Assignment # 1

Using C programming language implement the Booth's Signed Multiplication Algorithm. In this algorithm, you will use the input file input.txt. In your algorithm you are going to perform n number of multiplications. For each multiplication, first read the number of bits, and in the next line, read two binary numbers with that number of bits.

Each multiplication will have the following output:

Multiply 1001 and 0011

Product	*Q_{-1}*	*M*	*-M*	*Log*
0000	*0011*	*0*	*1001*	*0111*	***Populate Data***
0111	*0011*	*0*	*1001*	*0111*	***A = A - M***
0011	*1001*	*1*	*1001*	*0111*	***Shift***
0001	*1100*	*1*	*1001*	*0111*	***Shift***
1010	*1100*	*1*	*1001*	*0111*	***A = A + M***
1101	*0110*	*0*	*1001*	*0111*	***Shift***
1110	*1011*	*0*	*1001*	*0111*	***Shift***

1001 * 0011 = 11101011

-7 * 3 = - 21

The input.txt file will be as follows:

n // count of multiplications

bits // number of bits

n1 n2 // binary signed numbers n1 and n2

bits // number of bits

n1 n2 // binary signed numbers n1 and n2

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n1 n2 // binary signed numbers n1 and n2

…

bits // number of bits

n1 n2 // binary signed numbers n1 and n2

Please use the following function signatures:

```
int binaryToDecimal(char *binary)

char *decimalToBinary(int input)

char *take2sComplement(char *in)

boothMultiply(char* n1, char* n2)

// This function will read one multiplication operation inputs: read number of bits, will allocate memory

// according to number of bits, and will read n1 and n2.

void readMultiplicationOperation(file* pInfile, char** pN1, char** pN2)
```