BLG222E
Computer Organization

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Project #2

Basic Computer

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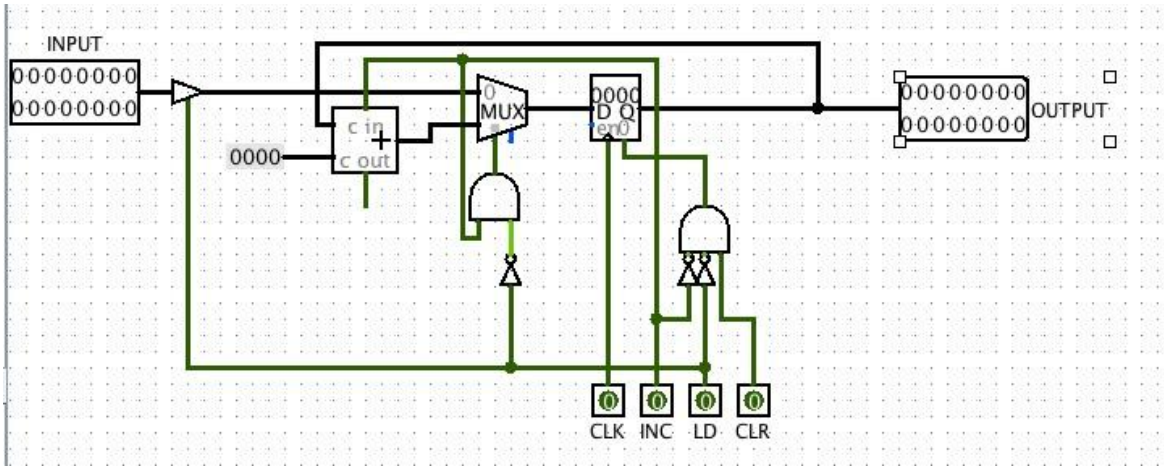
We use the Alu Design in

project 1

S_3	S_2	S_1	S_0	C (bit 0) in CCR	Operation	Function	Flag updates			
							Z	N	O	C
1	0	0	0	0	$F \leftarrow A$	Transfer A	√	√	√	√
1	0	0	0	1	$F \leftarrow A + 1$	Increment A	√	√	√	√
1	0	0	1	0	$F \leftarrow A + B$	Addition	√	√	√	√
1	0	0	1	1	$F \leftarrow A + B + 1$	Add with carry	√	√	√	√
1	0	1	0	0	$F \leftarrow A + \bar{B}$	Subtract with borrow	√	√	√	√
1	0	1	0	1	$F \leftarrow A + \bar{B} + 1$	Subtraction	√	√	√	√
1	0	1	1	0	$F \leftarrow A - 1$	Decrement A	√	√	√	√
1	0	1	1	1	$F \leftarrow A$	Transfer A	√	√	√	√
0	1	0	0	0	$F \leftarrow A \wedge B$	AND	√	√	–	–
0	1	0	0	1	$F \leftarrow \overline{A \wedge B}$	NAND	√	√	–	–
0	1	1	0	0	$F \leftarrow A \vee B$	OR	√	√	–	–
0	1	1	0	1	$F \leftarrow \overline{A \vee B}$	NOR	√	√	–	–
0	1	0	1	0	$F \leftarrow A \oplus B$	XOR	√	√	–	–
0	1	0	1	1	$F \leftarrow \overline{A \oplus B}$	XNOR	√	√	–	–
0	1	1	1	X	$F \leftarrow \bar{A}$	Complement A	√	√	–	–
0	0	0	0	0	$F \leftarrow shrA$	Logical shift right A into F	√	√	–	–
0	0	0	0	1	$F \leftarrow ashrA$	Arithmetic shift right A into F	√	√	–	–
0	0	0	1	0	$F \leftarrow cshrA$	Circular shift right A into F	√	√	–	–
0	0	0	1	1	$F \leftarrow shlA$	Logical shift left A into F	√	√	–	–
0	0	1	0	0	$F \leftarrow ashlA$	Arithmetic shift left A into F	√	√	√	–
0	0	1	0	1	$F \leftarrow cshlA$	Circular shift left A into F	√	√	–	–

Control Inputs (Register)			
LD	**INC**	**CLR**	**Function**
1	1	1	Loads from the input of the register
1	1	0	Loads from the input of the register
1	0	1	Loads from the input of the register
1	0	0	Loads from the input of the register
0	1	1	Increments the contents of the register
0	1	0	Increments the contents of the register
0	0	1	Clears the register
0	0	0	X

OUR 16-BIT Register Design:



Our Simple Computer