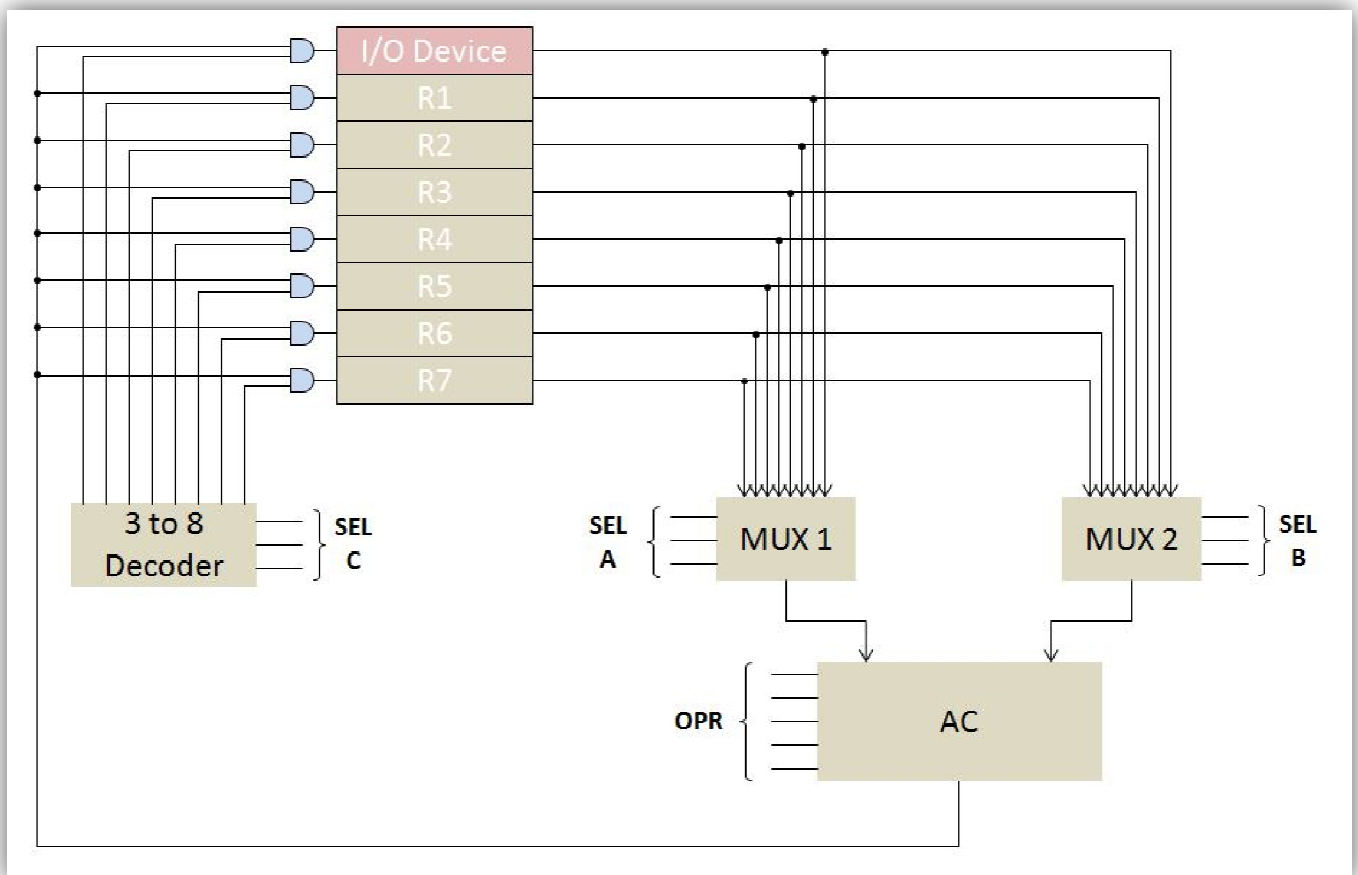


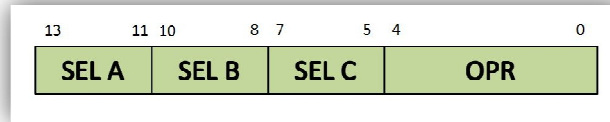
General Register Organization: In a CPU, some registers are very specific to their task hence they are used very frequently by the control unit. Some anonymous registers are also used and operations of these registers are subject to the need and type of information stored in them.

Following is an organization of these registers in a CPU:



As the diagram depicts, a block of seven registers is used for storing anonymous data. Two multiplexers of 8 to 1 size are used to extract the contents of two registers at a time. Here MUXes are of 8 to 1 size because we have another line for I/O devices along with seven registers. The two extracted values are processed in AC with the help of ALU. Here to specify the appropriate operation, five lines of OPR input are used. The computed output is then ANDed with the outputs of a 3 to 8 decoder. Since a decoder activates only one output line at a time, the computed output goes in only one register. The appropriate destination register is specified by the 3 input lines of decoder.

Control Word: A control word is binary information that makes the general register organization happen. It is basically a 4-part binary code consisting of SEL A, SEL B, SEL C and OPR Inputs in the general register organization diagram. The control word is as follows:



All the possible combinations of a control word and their respective selections are concluded in the following table:

Binary Code	SEL A	SEL B	SEL C
000	Input Dev.	Input Dev.	Output Dev.
001	R1	R1	R1
010	R2	R2	R2
011	R3	R3	R3
100	R4	R4	R4
101	R5	R5	R5
110	R6	R6	R6
111	R7	R7	R7

In the control word, since we know that the OPR is 5-bit information, it can denote a total of 25 operations. But here we conclude only 11 important operations.

OPR	Operation
00000	Transfer A
00001	Increment A
00010	A + B
00101	A - B
00110	Decrement A
01000	A AND B
01010	A OR B
01100	A XOR B
01110	Complement A
10000	Shift Right A
11000	Shift Left A

Assignment:

1. What are differences between a specific CPU register and general registers?
2. What does a control word do in general register organization?