2 Ans.:

Register File:

Register files are devices that can simultaneously deal with storing and retrieving data. A m x n register file consists of m internal registers, each capable of storing an n-bit binary number.

To store/read data at certain address, one has to input that address to the file and the value is stored at/read from the internal register at that address.

16x16 Register File with 2 read ports and 1 write port:

Circuit Notations:

Data_in is Data to be written

Output 1, Output 2 are Data that are read

regWrite is Enable input to write data

regClear when high clears data stored in all registers

W_addr is Register address in which data should be written

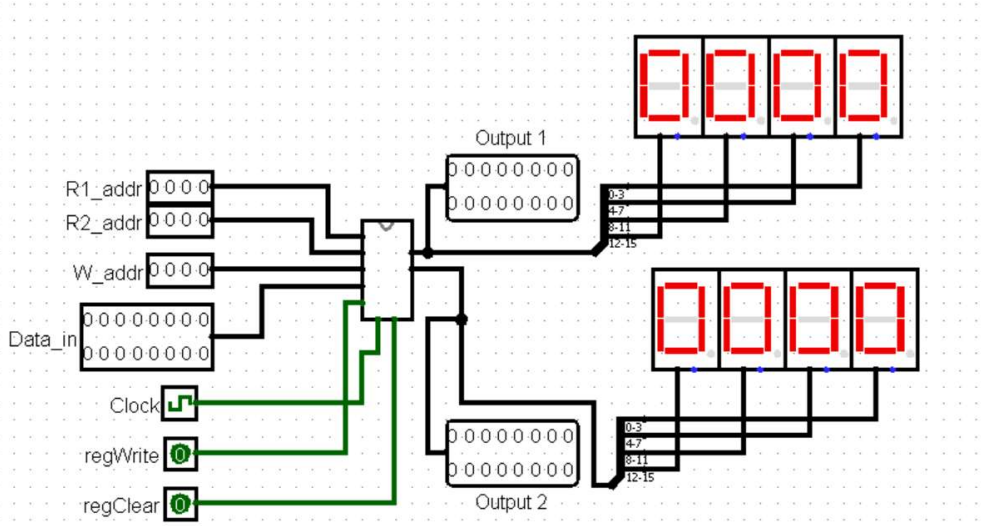
R1_addr, R2_addr is Register address from which data should be read

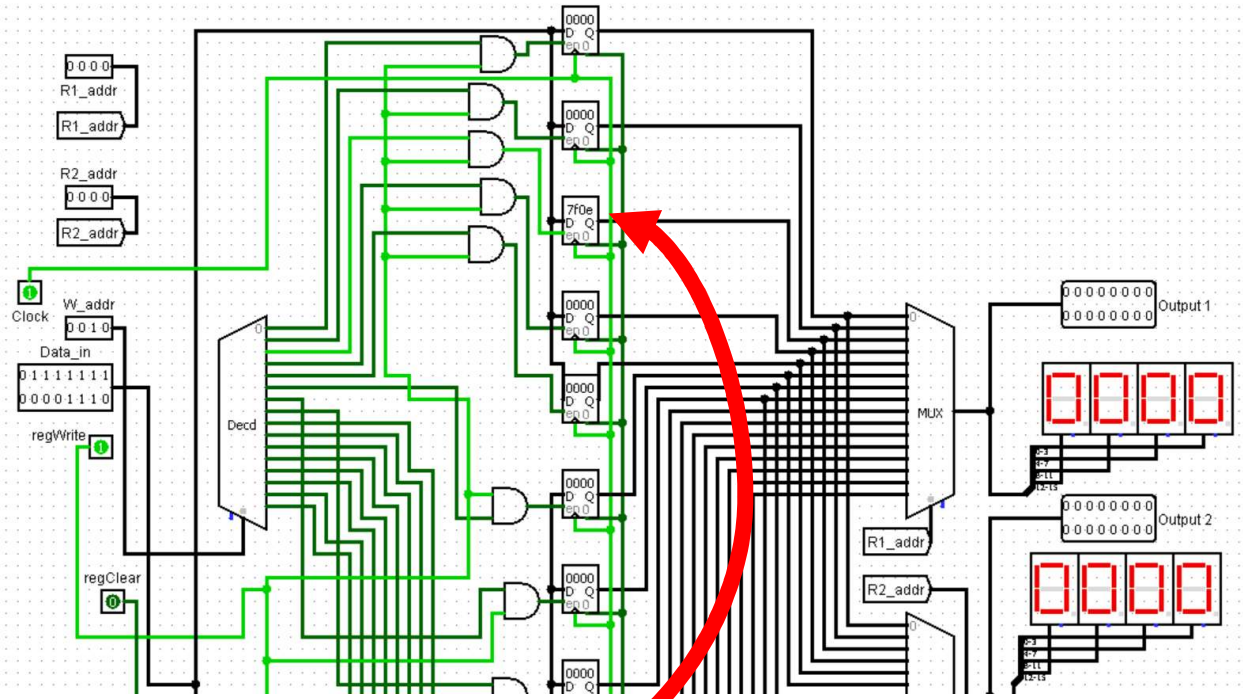
Example:

In the circuit diagram below, values are stored as follows,

Register Address	Data
0000	HEX 6164 (DEC 24932)
0001	HEX 8942 (DEC 35138)
0010	HEX 7f0e (DEC 32526)
0011	HEX 2000 (DEC 8192)

Block Diagram of the Circuit

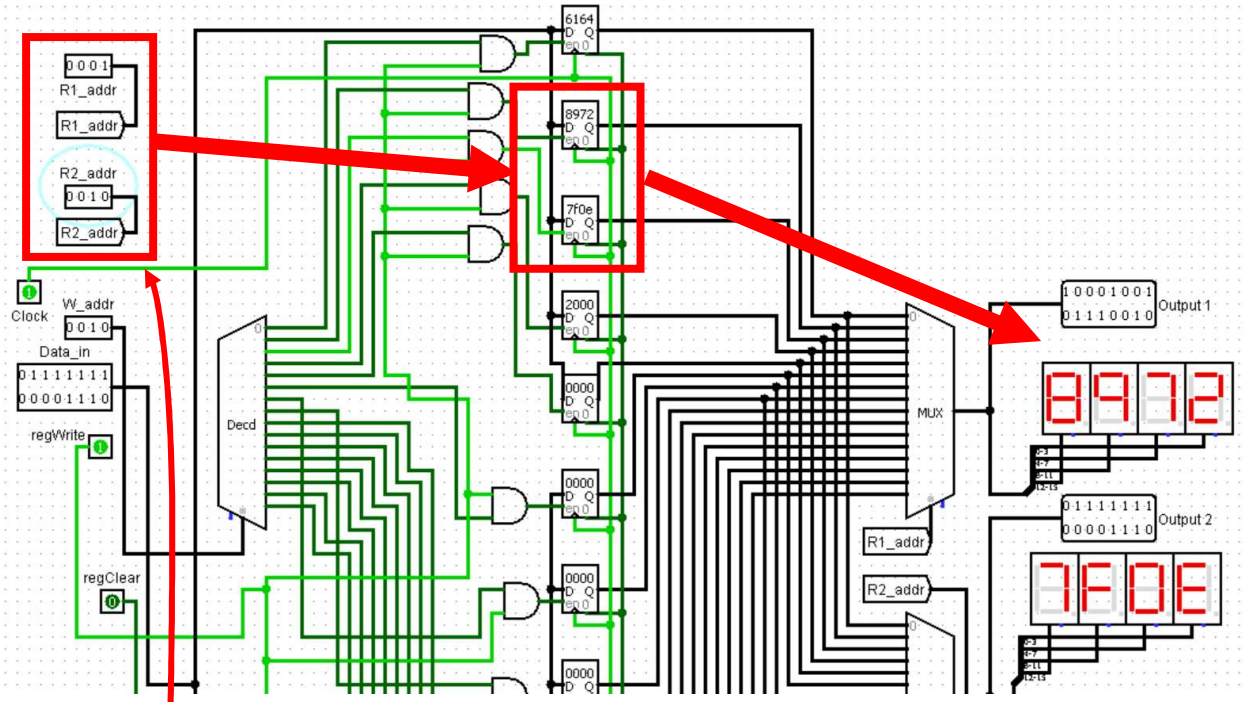




To **write** numbers to the register file, **procedure** is:

1. Set **W_addr** to desired address (0010)
2. Set **Data_in** to desired value (7f0e – BIN 0111 1111 0000 1110)
3. Set **regWrite** to 1
4. Toggle the **Clock**. The value above is stored in the register at address mentioned. (You can verify this by setting **R1_addr** to 0010).

We can store all other values in the same way.



To **read 2** numbers to the register file, just set **R1_addr and R2_addr** to desired addresses (for e.g., 0001, 0010). The stored values (8942, 7f0e) are displayed as the outputs.

To clear all stored data, set **regClear** to 1.
