**Problem statement:**

**Design a CPU**

**Word size: 3 bits.**

**Operations: NOT, SHR.**

**Register No: 6**

**Size of ram: 8**

**Word size of ram: 18bits**

**Register mode, Immediate mode, JNC**

**Register Mode**

Not Operation ISA:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Opcode | | | Register | | | Register | | | unused | | | | | | | | |
| Mode | | Operation |
| 0 | 0 | 0 | 000-111 | | | 000-111 | | | x | x | x | x | x | x | x | x | x |
| 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

SHR Operation ISA:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Opcode | | | Register | | | Register | | | unused | | | | | | | | |
| Mode | | Operation |
| 0 | 0 | 1 | 000-111 | | | xxx | | | x | x | x | x | x | x | x | x | x |
| 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Immediate Mode**

Not Operation ISA:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Opcode | | | Register | | | value | | | unused | | | | | | | | |
| Mode | | Operation |
| 0 | `1 | 0 | 000-111 | | | 000-111 | | | x | x | x | x | x | x | x | x | x |
| 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

SHR Operation ISA:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Opcode | | | Register | | | value | | | unused | | | | | | | | |
| Mode | | Operation |
| 0 | 1 | 1 | 000-111 | | | 000-111 | | | x | x | x | x | x | x | x | x | x |
| 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**JNC operation branching mode:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Opcode | | | Address | | | unused | | | | | | | | | | | |
| Mode | | Operation |
| 1 | 0 | 0 | 000-111 | | | x | x | x | x | x | x | x | x | x | x | x | x |
| 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |