|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Instruction** | **RTL** | **Registers** | | | | | | | **Memory** | | | |
| **A** | **B** | **C** | **PC** | **IR** | **MAR** | **MBR** | **14 (Q)** | **15 (R)** | **16 (S)** | **17 (T)** |
| Initial | - | ?? | ?? | ?? | 00 | 21 | ?? | ?? | 3A | 19 | FD | 00 |
| LOAD S  (21) | MAR ← S  MBR ← M[MAR]  A ← MBR  PC ← PC + 2  IR ← M[PC] | **FD** | ?? | ?? | **02** | **10** | **16** | **FD** | 3A | 19 | FD | 00 |
| MOV C, A  (10) | C ← A  PC ← PC + 2  IR ← M[PC] | FD | ?? | **FD** | **04** | **21** | 16 | FD | 3A | 19 | FD | 00 |
| LOAD R  (21) | MAR ← R  MBR ← M[MAR]  A ← MBR  PC ← PC + 2  IR ← M[PC] | **19** | ?? | FD | **06** | **10** | **15** | **19** | 3A | 19 | FD | 00 |
| MOV B, A  (10) | B ← A  PC ← PC + 2  IR ← M[PC] | 19 | **19** | FD | **08** | **21** | 15 | 19 | 3A | 19 | FD | 00 |
| LOAD Q  (21) | MAR ← Q  MBR ← M[MAR]  A ← MBR  PC ← PC + 2  IR ← M[PC] | **3A** | 19 | FD | **0A** | **50** | **14** | **3A** | 3A | 19 | FD | 00 |
| SUB A, B  (50) | A ← A - B  PC ← PC + 2  IR ← M[PC] | **21** | 19 | FD | **0C** | **40** | 14 | 3A | 3A | 19 | FD | 00 |
| ADD A, C  (40) | A ← A + C  PC ← PC + 2  IR ← M[PC] | **1E** | 19 | FD | **0E** | **31** | 14 | 3A | 3A | 19 | FD | 00 |
| STORE T  (31) | MAR ← T  MBR ← A  M[MAR] ← MBR  PC ← PC + 2  IR ← M[PC] | 1E | 19 | FD | **10** | **??** | **17** | **1E** | 3A | 19 | FD | **1E** |

For each instruction in the program, above, fill out the entire row of register and memory values after that instruction executes. Highlight in **bold** and/or red any values that have changed because of this current instruction.