# ABC Machine Program Try-It

Part 1: Fill in the Description Column in the table below for each of the Instructions / Data shown below a few are filled in for you

|  |  |  |
| --- | --- | --- |
| Address | Type (Instruction or Data) | Description |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | | Holds Load Instruction:  Loads the value at  Memory Address  1111 into the source  1 register (register 000) |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 0 | 0 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | | Holds load Instruction:  Loads the value at Memory  Address 1110 into src1  ( register 000) |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 0 | 1 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | | Holds Branch Instruction:  Based on the nzp value it  Will update the PC  counter to 0110 |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 0 | 1 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | | Holds Load Instruction:  Loads the value at memory  Address 1101 into src1  Register(001) |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 1 | 0 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | | Holds Subtract instruction:  Subtract values src1 and  Src2, stores it in dest  Reigester (101) |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 1 | 0 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | | Holds Store Instruction:  Stores value of memory  Address 1111 in src1  Register (000) |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 1 | 1 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | | Holds Jump Instruction:  Based on opcode it moves  the PC counter to  New position (0110) |
| |  |  |  |  | | --- | --- | --- | --- | | 0 | 1 | 1 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | | Holds Branch Instruction:  Based on the nzp value it  Moves PC counter  to 0110 |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 0 | 0 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | Stop (hault) execution is  done |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 0 | 0 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | Stop (hault) execution is  done |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 0 | 1 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | Stop (hault) execution is  done |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 0 | 1 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | Stop (hault) execution is  done |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 1 | 0 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | Stop (hault) execution is  done |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 1 | 0 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | | Holds Data Value Decimal  7 |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 1 | 1 | 0 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | | Holds Data Value Decimal  1 |
| |  |  |  |  | | --- | --- | --- | --- | | 1 | 1 | 1 | 1 | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | | Holds Data Value Decimal  2 |

Part 2: Execute each of the instructions above and show the final state of the registers and memory below:

|  |  |
| --- | --- |
| Register | Contents |
| 0 | 01 |
| 1 | 111 |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 | 1010 |
| 6 |  |
| 7 |  |

|  |  |
| --- | --- |
| Memory Address | Memory Contents(only fill in the changes) |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| A |  |
| B |  |
| C |  |
| D |  |
| E |  |
| F | 01 |