Task 8.1P

Code Line # (starting from #10)	A register	D register	M register	ALU	Data memory	Instruction memory	Program counter	Data bus
#10	The A-register is configured to 17	NA	M register refers to the memory that holds the variable Iin RAM[17]	NA	Data The memoryis instruction accessed memory toread inputisset RAM[17] to wherethe addressof valueofiis #11 stored.		The program counter is set to PC++ represents address of #11 instruction	The control bit is passed to the A register and loaded with the value 17. To access a memory location, the address of variable i is input to the address bus. The control bit is sent to the PC and its value is incremented by one.
#11	A register is set to the value stored in RAM[17]	The contents of the M register representing the value of the variable are transferred and stored in theD register.	NA	NA	NA	Instruction memory input is set to the address of #12.	The Acontrol program signalis counteris passedtothe settoPC++ Dregisterand representin thevalue gthe storedinthe addressof Mregisteris thenext loaded. instruction (#12)	

#	A register	D register	M register	ALU	Data memory	Instruction memory	Program counter	Control
#12	A register is set to the address of variable sum in RAM.	NA	NA	NA	Thevalue storedin memory RAM at the address tothe specified addressof bytheA #13. register is read by accessing data memory.	Instruction memory input is set address of	The program counter is set to PC++ representin gthe address of the next instruction (#13)	A control signal is transferred to the A register to facilitate loading the address corresponding to the "Sum" variable.
#13	A register is set to the address of variable sum in RAM	The value of variable 'i' is stored in the D register .	TheM register is modified by adding its current value to the contents stored in theD register. NA	The ALU performs the addition operation (M+D)	Records the modified value at the location indicated by the address stored in theA register.	Instruction memory input is set to the address of #14.	The program counter is set to PC++ representin gthe address of the next instruction (#14)	A control signal is sent to the M register and adjusts its value by adding its current contents to the value stored in the D register.
#14	A register is set to the address of variable sum in RAM	The value of theD register is changed by increasin gthe current value by 1.		The ALU performs the addition operation (D+1)	NA	Instruction memory input is set to the address of #15.	Program counter is set to PC++ representin gthe address of the next instruction (#15)	The value in the D register is adjusted by sending control bits to increment its current value by1.
#15	A register is set to the address of variable i in RAM	NA	NA	NA	NA	Instruction memory input is set to the address of #16	Program counter is set to PC++ representin gthe address of the next instruction (#16)	A control signal is passed to the A register to facilitate loading the address corresponding to variable'i'.

#16	A register is set to the address of variable i in RAM	The register dvalue is of modified iis includin theD register.	TheM NA change variable by savedin gthe storedin		Records the modified value at the location indicated by the address stored in theA register.	Instruction memory input is set to the address of #17	Program counter is set to PC++ representing the address of the next instruction (#17)	A control signal is sent to the M register and its value is changed by updating it with the contents of the D register.
#17	A register is set to the address of variable n in RAM.	NA	NA	NA	NA	Instruction memory input is set to the address of #18	Program counter is set to PC++ representing the address of the next instruction (#18)	A control signal is transferred to the A register and starts loading the address corresponding to variable'n'.
#18	A register is set to the address of variable n in RAM	TheD register is changed by computing the result of the subtraction operation(M-D).	NA	ALU performs the subtraction operation (M - D)	NA	Instruction memory input is set to the address of #19	Program counter is set to PC++ representing the address of the next instruction (#18)	A control signal is sent to the D register, which is loaded with the result of the subtraction operation.
#19	A register is set to the address of the label END	NA	NA	NA	NA	Instruction memory input is set to the address of #20	Program counter is set to PC++ representing the address of the next instruction (#20)	The control signal is passed to the A register and the address associated with the label "END" is loaded.

#20	A register is set to the address of the label END	The result of the subtraction (n - i) is stored in theD register.	NA	NA	NA	If the condition (D < 0) is met, the instruction memory input is set to the address labeled "END". Otherwise, the program advances to the next instruction.	The program counter is adjusted accordingly. If the condition is true, it will be set to the address of label "END". Otherwise, it is incremented by 1 and indicates the address of the next instruction (#21).	Transfer the control signal to the D register and load the result of the subtraction operation.