1. (5 points) The diagram below shows a memory array containing 16 words of 4 bits each. Fill in the missing information in the timing diagram below (indicated by the question marks) and show how the operations shown in the timing diagram change the memory contents.
2. (5 points) The simulation output below is from the basic processor running a program. Several parts of the output have been blanked out. Fill in the five blanks.

0000 halt – halt execution
0001 negate – \( ACC := -ACC \)
1xxx immediate load – if sign bit of xxx is 0 then \( ACC := 0xxx \) else \( ACC := fxxx \)
2xxx direct load – \( ACC := M[0xxx] \)
3xxx indirect load – \( ACC := M[M[0xxx]] \)
4xxx direct store – \( M[0xxx] := ACC \)
5xxx indirect store – \( M[M[0xxx]] := ACC \)
6xxx branch – \( PC := 0xxx \)
7xxx branch if zero – if \( ACC = 0 \) then \( PC := 0xxx \)
8xxx branch if positive – if \( ACC > 0 \) then \( PC := 0xxx \)
9xxx branch if negative – if \( ACC < 0 \) then \( PC := 0xxx \)
axxx add – \( ACC := ACC + M[0xxx] \)