1) Consider the following MIPS code sequence

```
lw  $t2, 40($t5)
add $t5, $t2, $t8
sub $t3, $t2, $t5
sw $t3, 20($t5)
```

a) *Assuming no forwarding*, identify all pipeline hazards between pairs of instructions

b) *Assuming no forwarding*, insert *stalls* as needed to overcome these hazards. How many clock cycles are needed to finish these instructions?

c) Assuming we use forwarding, insert stalls as needed to overcome these hazards. *How many clock cycles are needed to finish executing these instructions*?

2) Draw the 2-bit branch prediction FSM. Then, given the 2-bit branch prediction method, with the initial state of N*, and the following set of branches, Describe the set of branch predictions

N, N, T, T, N, N, T, N, N

3) Draw the 2-bit branch prediction FSM. Then, given the following branch addresses and branches, show the final state of a k=3 correlating prediction model

10001101	T
10001101	T
10001000	T
10001111	N
10001000	N
10001101	T
10001000	T
10001000	T
10001000	T