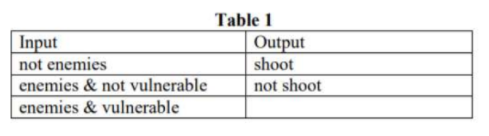
**Question 1**

You are going to develop a simple shooting game. There is one hero in a battlefield with few enemies and other characters. There are three states in the game which are WANDER, EVADE and ATTACK. When the hero is wandering the field and suddenly encounters enemies while he is not in vulnerable situation, he will go into ATTACK stage by shooting the enemies. However, if while wandering the field and the hero suddenly encounters enemies and he is in vulnerable situation, he will shoot the enemies and goes into EVADE stage. While in ATTACK stage, if the hero encounters enemies and he is not vulnerable, he will remain in that stage and continues shooting. But if he encounters enemies and he is vulnerable, he will shoot and goes into EVADE stage. While in EVADE stage, if the hero encounters enemies and he is not vulnerable, he will go into ATTACK stage and shoots. But if he encounters enemies and he is vulnerable, he will remain in that stage and continues shooting. When the hero encounters characters that are not his enemies, he will not shoot. If he is in the WANDER stage at that time, he will continue wandering the field. If he is in ATTACK or EVADE stages, he will switch into WANDER stage. The inputs and outputs are given in the Table 1 below. Construct a finite state diagram to model the game.



**QUESTION 2** ATM is a computerized machine that provides bank customers to gain access to their accounts using magnetic encoded plastic card and code number. It enables the customer to perform online transactions without involving cashier, clerk, and bank teller. The customer makes cash withdrawal, check account balances, transfer money as well as purchase prepaid mobile phone credit by using ATM card. Typical PIN based ATM has following processes:

• Insert ATM card to establish interface. The card will be validated to ensure the correct ATM card is inserted. If the card is unsuccessfully validated, the card is ejected, and ATM session is terminated.

• For valid ATM card, user is asked to enter the PIN and press the execution key for the system to match the PIN, if PIN does not match, then user access is denied to the next stage and he or she is requested to repeat the operation with the correct PIN for a fixed two retries.

• If after the third time the PIN is unmatched, the card will be locked, and ATM session is terminated.

• If the PIN matches, then the transaction interface is displayed, and user has to select the transaction that they wish to perform.

• After the machine performs the chosen transaction, it will prompt user if a new transaction is to be performed. If the response is ‘Yes’, the transaction interface is again displayed and if ‘No’ the transaction is terminated, and card ejected, and ATM session is terminated.

Based on the above description, the states, inputs and outputs are as follow:

**States:**

S1: Welcome screen S6: Choosing transaction screen.

S2: Validating card S7: Performing transaction

S3: 1st PIN entering screen S8: Asking for other transaction screen.

S4: 2nd PIN entering screen S9: Terminate ATM session

S5: 3rd PIN entering screen.

**Inputs:**

A: Insert ATM card F: Transaction is selected

B: Valid ATM card G: Complete transaction

C: Invalid ATM card H: Yes, for other transaction

D: Correct PIN I: No for other transaction screen

E: Incorrect

**PIN Outputs:**

0: Nothing happened

1: Eject ATM card 2: Lock ATM card Draw the transition diagram for the above system.