**2017 AI Autumn**

**Question 4**

**(a)**

**(i)** **What function would Artificial Intelligence (AI) serve in a typical modern game?**

**(2 Marks)**

Artificial Intelligence is used to control the Non-Player Characters of the game such as enemies.

**(ii)** **Finite State Machines (FSM) are one of the techniques used to implement AI in some games. Discuss, addressing the following topics**

**• Sensing Stage (2 Marks)**

The sensing stage is the AI Looking for information to make it change state. i.e. a guard on patrol.

**• Thinking Stage (2 Marks)**

The thinking stage is the AI processing what to do with the information given. i.e. a guard sees you.

**• Action Stage (2 Marks)**

The Action stage is the AI carrying out its function. i.e. The guard attacking.

**• Advantages and Disadvantages**

**Advantage:** Very easy to use and fast.

**Disadvantage:** Is dumb and can’t be used for anything other than basic AI control.

**(b) The AI used in games like Chess and Draughts would be seen as a Search Problem**

**(i) How do Search Problems work? (3 Marks)**

Search problems create a tree which describes all possible moves to the end of the game.

**(ii) What is the Utility Function? (1 Mark)**

A utility function attaches a numeric value to the result of the endgame. i.e. 1 win,-1 loss,0 draw

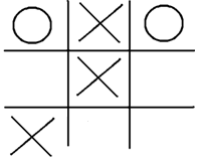
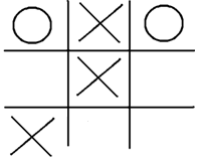
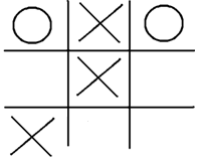
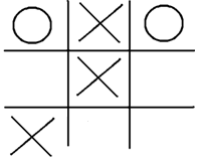
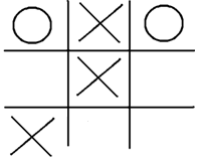
**(iii) What is an Evaluation Function? (1 Mark)**

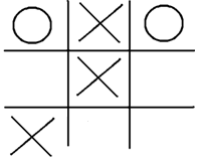
An evaluation function applies a numeric value to the nodes of the tree.

**(iv) Compare the practicality of the implementations of the AI for Tic-Tac-Toe against a game like chess or draughts. What are the main issues in producing reasonable AI? How could the performance be improved etc. (5 Marks)**

**(v) Construct the branch of search tree for the correct move and justify why the algorithm will choose this move...**

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