Q1.By the time you are 49, what role do you see...

a. yourself having played (or playing) in the advancement of artificial intelligence (AI), if any.

I have always admired Biologically inspired systems, and with tones and tones of data being generated everyday quite some interesting patterns have surfaced. Proteins are a key component in the human body, I would have been working on Protein Fold datasets to create a system which tracks the proteins in the body to detect anomalies and hopefully even find a new protein template synthesis of which could open a new sector of research.

b. AI playing in society at large.

AI as the name suggests is trying to mimic Human Intelligence at large. With the advance in the development of AI and its multifaceted applications, AI with multi-disciplinary integrated functioning would be a prominent occurrence. Home robot assistants, shopping robot assistants, work place robot assistants would replace the need for human intervention for trivial things like shopping for grocery, scheduling work and taking notes, cleaning the house with the combination of Computer vision, NLP, Robotics and with knowledge from a huge dataset.

Approximately 25 years down the lane, I imagine that there will be bots which have fairly imitated human emotions, are self-aware and involve more than just tackling a single task at hand. Social media wouldn't be just humans interacting with each other, it would be more involved in our lives . AI would offer emotional support, more humans would turn to AI and would be even more detached from the real world than they are in this day and age. NLP

Q2

Agent Type	Performance Measure	Environment	Actuators	Sensors
Wrap a box in newsprint.	Time taken to wrap, Covering the entire surface area, optimum layers of wrap over the same area	Newsprint, wrapping station	Sticking tape, Scissors	Camera,
Achieve the highest score on Pac-Man.	Number of dots accumulated, Number of ghosts consumed	Maze, Pac-dots, ghosts	Power Pellets, 3 lives	Keyboard entry
Hit a clay pigeon with a robotic, turret-mounted shotgun.	Ratio of hits to miss, number of hits per unit time	Clay pigeon, Robotic system	Trigger, Display of the target	Camera, Angle sensors

Q3

A. **State Representation :** The state can be determined by a snapshot of the 5x5 grid at any given point. We have 7 pieces, each of which can be rotated in 3 possible angle configurations - 90, 180 or 270 degrees. A new state is achieved when a given piece is rotated to any of the possible configurations. There are $3^7 = 2187$ possible world states. Example states In[P1-0 P2-0 P3-0 P4-0 P5-0 P6-0 P7-0] where P1, P2 are Piece 1, Piece 2 and 0 is the rotation angle

B. **Successor functions:**

- **Initial state**: Any state can be designated as the initial state. User defines the initial state. In[P1-0 P2-0 P3-0 P4-0 P5-0 P6-0 P7-0]

- **Actions**: Each state has just three actions on one particular piece at a time: *rotate 90*, *rotate 180*, and *rotate 270*. *Eg P1rotate90*

- **Transition model**: RESULT(In[P1-0 P2-0 P3-0 P4-0 P5-0 P6-0 P7-0] , *P1rotate90) =* In[P1-90 P2-0 P3-0 P4-0 P5-0 P6-0 P7-0]

C. Branching Factor : 3. Every node will branch out into 3 angle configurations. Every level of the tree would be dedicated to the rotation of 1 particular piece in the tangram.

D. Maximum Search Depth : 7.

Q4 (Attached)

Q5 (Attached)