University of Asia Pacific (UAP)

Department of Computer Science & Engineering

Program: B.Sc. in Computer Science and Engineering
Mid-Term Examination, Fall 2020

Course Code : CSE 403

Course Title : Artificial Intelligence and Expert Systems

Name: Sudip Ghose

Reg. ID: 18101094

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Ans to the qus no. 1(a)

The turing test is a deceptively simple method of determining whether a machine can demonstrate human intelligence.

Here are some features that would be required for an intelligent machine to pass the turing test.

1. Natural Language Processing: to enable it to communicate sucessfully in english.

2. knowledge representation to store what it knows or hears.

3. automated reasoing to use the stored information. to answer question and draw conclusion.

4. machine learning to adapt to the new circumstance and to detect patterns.

Total turing test include a video signal, so that the introgat-or can test the subject's perceptual abilities.

Additional capabilities to pass total turing test;

1. computer vision to perceive ~~an~~ object and environment.

2. Robotics to manupulate and move object.

Ans to the qus no. 1(b)

PEAS

Agent: Trash Picking Robot.

Performence measure:

percentage of collecting ~~po~~ trash to dustbin.

Cleanness.

efficiency.

Environment:

Trash

Room

Dustbin

various obstacles.

Acutators:

Wheel

Brushes

Jointed arms

Hand

Sensor:

camera

Trash detection sensor

Infarad sensor

Bump sensor

cliff sensor

sonar sensor.

This is a short description of my intelligent agent.

Ans to the qus no. 2

$h(A) = 94\% 4 + 2 = 2 + 2 = 4$

$h(B) = 94\% 85 + 3 = 4 + 3 = 7$

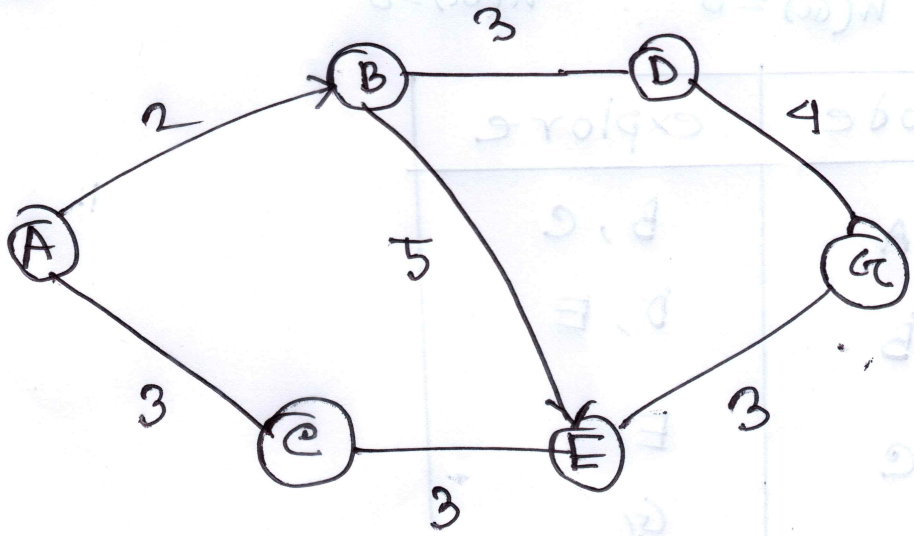
$h(C) = 94\% 6 + 1 = 4 + 1 = 5$

$h(D) = 94\% 5 + 2 = 4 + 2 = 6$

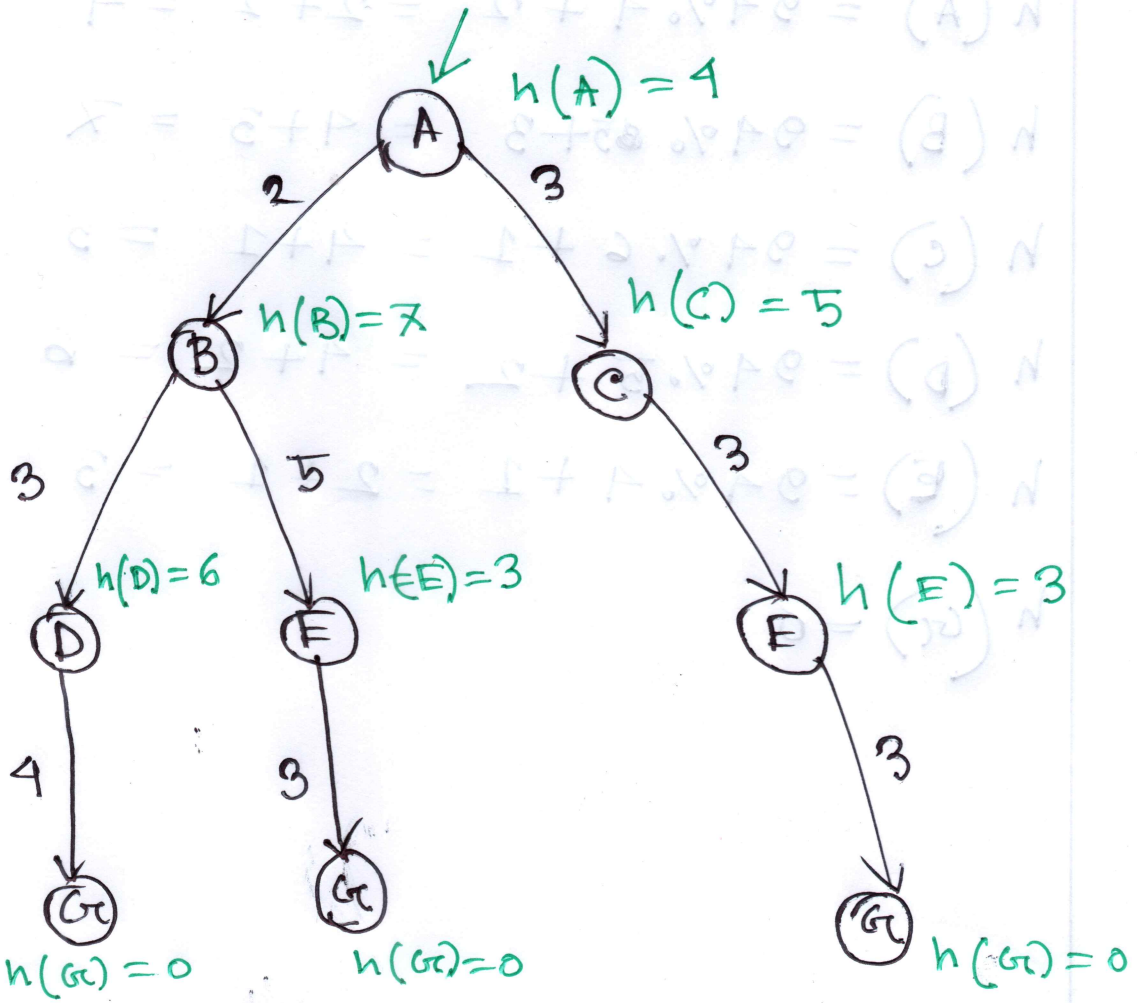
$h(E) = 94\% 4 + 1 = 2 + 1 = 3$

$h(G) = 0$

Graph:



Search Tree:



Node	explore
A	B, C
B	D, E
C	E
D	G
E	G

A* search tree:

iteration	state expand	h(n)	g(n)	f(n) h(n)+g(n)	close fringe	open fringe.
1	A	4	0	4	A	B, C
2	A→C	5	3	8	A, C	B, E
3	A→C→B	7	2	9	A, C, B	E, D, E
4	A→C→B→E	3	6	9	A, C, B, E	D, E, Gr
5	A→C→B→E→E	3	7	10	A, C, B, E, E	D, Gr, Gr
6	A→C→B→E→E→E→D	6	5	11	A, C, B, E, E D	Gr, Gr, Gr
7	A→C→B→E→E→E→D→Gr	0	9	9	A, C, B, E E, D, Gr	Gr, Gr

∴ path return: A → B → D → Gr

Path cost: 9

Ans

Ans to the qus no. 3(a)

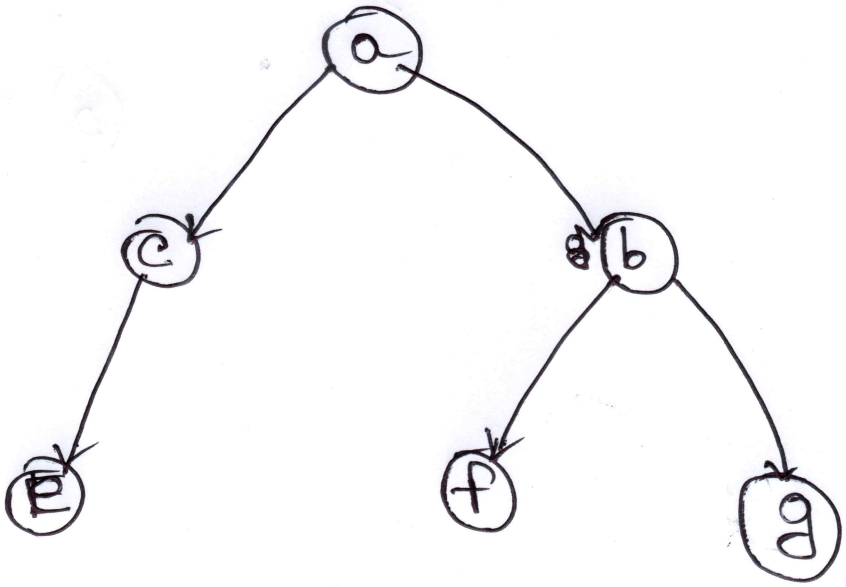
Simple reflex agent are the simplest agents. these agent take decision on th basis of the current percepts and ignore the rest of percept history.

Model based agent can work in a partially observable environment. then track the situation. These agent has two important factor. Those are:

Model and Interanal state

Ans to the ques no. 3(b)

a state graph of 6 nodes:



(I) Breadth First Search:

a → c → b → e → f → g

(II) DFS:

a → c → e → b → f → g

(III) IDS:

a, a → c → b , a, c, e, b, f, g