University of Asia Pacific

Department of CSE

Mid-Semester Examination, Fall 2020

Name: Rashik Rahman

Reg ID: 17201012

Year: 4th

Semester: 1st

Course Code: CSE 403

Course Title: Artificial Intelligence & Expert System

Date: 22.02.2021

"During Examination and upload time I will not take any help from anyone. I will give my exam all by myself."

University of Asia Pacific

Admit Card

Mid-Term Examination of Fall, 2020

Financial Clearance	PAID

Registration No : 17201012

Student Name : Rashik Rahman

Program : Bachelor of Science in Computer Science and Engineering

SI.NO.	COURSE CODE	COURSE TITLE	CR.HR.	EXAM. SCHEDULE
1	CSE 400	Project / Thesis	3.00	
2	CSE 330	Industrial Training	1.50	
3	CSE 401	Mathematics for computer Science	3.00	
4	CSE 403	Artificial Intelligence and Expert Systems	3.00	
5	CSE 404	Artificial Intelligence and Expert Systems Lab	1.50	
6	CSE 405	Operating Systems	3.00	
7	CSE 406	Operating Systems Lab	1.50	
8	CSE 407	ICTLaw, Policy and Ethics	2.00	
9	CSE 410	Software Development	1.50	
10	CSE 427	Topics of Current Interest	3.00	

Total Credit: 23.00

1. Examinees are not allowed to enter the examination hall after 30 minutes of commencement of examination for mid semester examinations and 60 minutes for semester final examinations.

2. No examinees shall be allowed to submit their answer scripts before 50% of the allocated time of examination has elapsed.

3. No examinees would be allowed to go to washroom within the first 60 minutes of final examinations.

4. No student will be allowed to carry any books, bags, extra paper or cellular phone or objectionable items/incriminating paper in the examination hall.
Violators will be subjects to disciplinary action.

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Answer to the Q.NO.1

(a)

PEAS is a performance measure for an intelligent agent. Full form PEAS is Performance, Environment, Actuators, Sensors. PEAS for a Coffe delivery robot are the following:

Performance: The delivery must be "fast" while maintaining "safety" & "cleanliness". It should be able to maximize the "profit" for each cup it delivers.

Environment: The "path" it takes the "surrounding" it goes through, "person" and "object" it passes thorough are it's environment.

Actuators: All the moving components i.e. it's "wheels/legs", "motor", "motorized tray", "hand" (if the robot has any) are considered to be its actuators.

Sensors: All the equipment that the robot uses to get a perception of its surrounding is it's sensor. Like camera, sonar senson, NFC, IR sensor, heat signature senson and so on.

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Answer to the Q.No.1(b)

As our coffe delivery robot is an intelligent autonomos agent so its environments are as follows:

i) Fully observable: Our robot belongs to fully obensable environment. Cause as our robot is autonomos so its has all the senson it needs to fully percept on access the complete state of its sunnounding

ii) Stochastic: Our robot delivens coffe in the real world. And we know in real world everything happens on changes randomly for that we have to emprovise. For this reason our robot belongs to stochastic environment.

iii) Sequential: As everything changes and everything is dynamic so our robot must keep tracke on history of its previous perception sequence and based on it must make a move. Thus it belongs to sequential environment.

iv) Dynamic: As in real world everything changes randomly thus our ~~agent~~ robot needs to handle all the dynamic changes ~~thus~~ thus belong to dynamic environment.

v) Continuous: In the real world there may be infinite number of perceptions so it belongs to continuous environment.

vi) Single: Also there's just one robot so it belongs to single agent.

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Answer to the Q.NO.2

$h(a) = 12\%3+3 = 3$

$h(b) = 12\%6+2 = 2$

$h(c) = 12\%4+2 = 2$

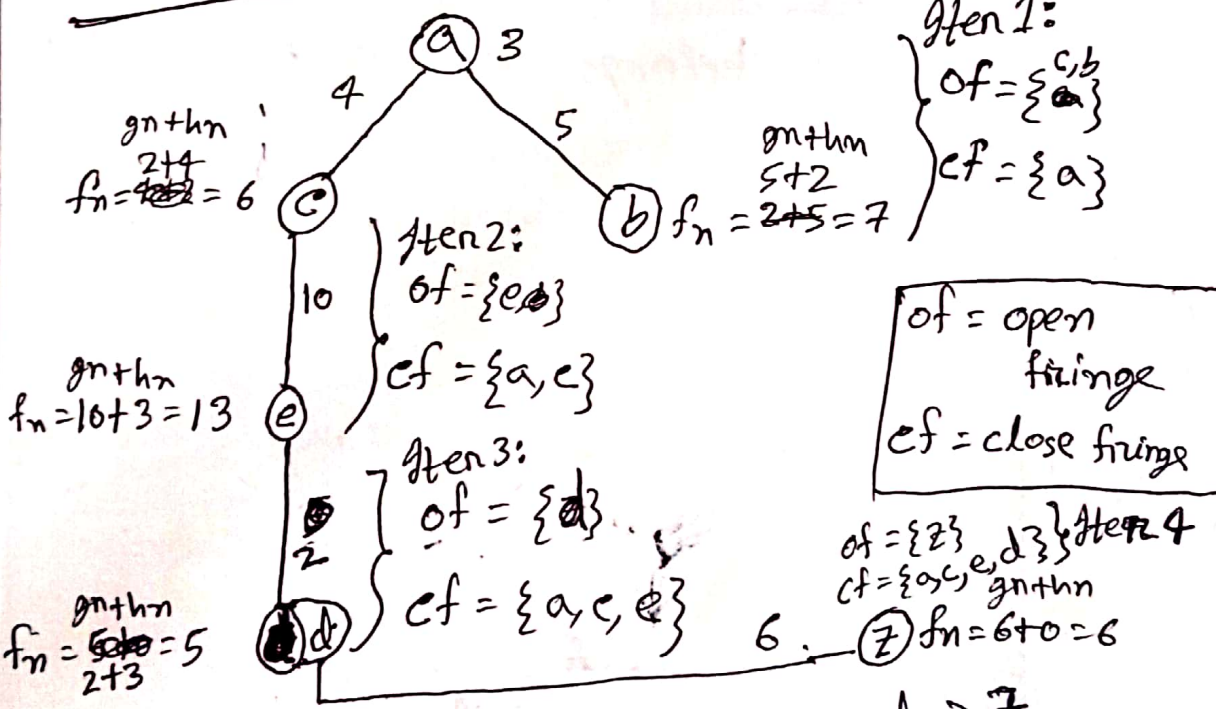
$h(d) = 12\%2+3 = 3$

$h(e) = 12\%5+1 = 2+1 = 3$

$h(z) = 0$

For A* we calculate, $f_n = g_n + h_n$ and take the node with lowest f_n to expand it.

Search tree:



∴ Shortest path : a → c → e → d → z

As admissibility isn't enough thus we couldn't get optimal path of a→b→d→z. If we considered consistency then we would be able to achieve

optimal path. This is ~~the~~ ~~do~~ a drawback of A*.

Answer to the Q. No. 3(a)

No

I can't defferentiate between an ~~it~~ intelligent and national agent. An ~~it~~ intelligent agent can perceive, makee decisions, take actions and the action taken by intelligent agent is national. A national agent also have these same qualities. It always tries to take the national action and always tries to do the right thing. So if an agent ~~want~~ wants to be intelligent it must have national propenties. Thus an intelligent and a national agent ~~are~~ are the same thing.

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(6)

Answer to the Q. No. 3(b)

$i = 12\%3 + 1 = 1$

$P = 3i - 1$

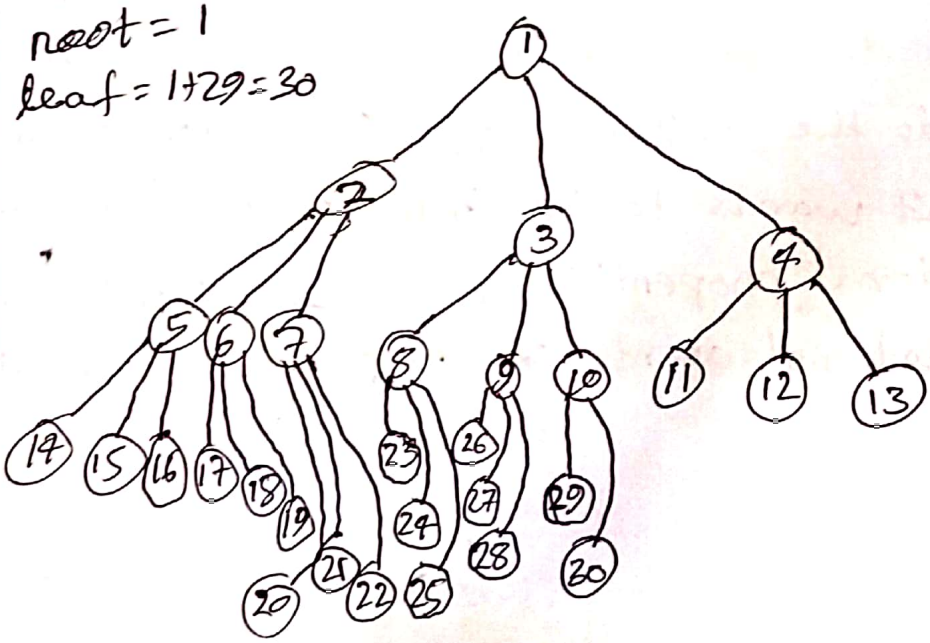
$q = 3i$

$r = 3i + 1$

(i) Tree:

root = 1

leaf = 1 + 29 = 30



(ii)

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(7)

(ii) For BFS sequence/order in which node will be visited is:

Goal = 1+28 = 29

1→2→3→4→5→6→7→8→9→10→11→12
→13→14→15→16→17→18→19→20→21→22
→23→24→25→26→27→28→29

For IDS sequence will be:

Goal = 7+28 = 29

For 1st iteration:

1→2→3→4

For 2nd iteration:

1→2→5
1→2→6
1→2→7
1→3→8
1→3→9
1→3→10
1→4→11
1→4→12
1→4→13

For 3nd iteration:

1→2→5→14
1→2→6→15
1→2→5→16
1→2→6→17
1→2→6→18
1→2→6→19

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1→2→7→20

1→2→7→21

1→2→7→22

1→3→8→23

1→3→8→24

1→3→8→25

1→3→9→26

1→3→9→27

1→3→9→28

1→3→10→29

So this is the visited order of IDS.