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Course: Artificial Intelligence

Question 1:

What are the four paradigms of AI?

Answer:

Followings are 4 paradigms of artificial intelligence

1) Thinking like human
2) Thinking as rationally
3) Acting like human
4) Acting as rationally

Question 2:

What will if there is no "critics" in learning based agents?

Answer:

The performance status is measured by the critics. Critics always suggests the perfect rational action which should be implemented. Critics also measure the success of the agent, so its very important part of the learning based agents.

As a example we can think the AI player of chess board game. Where AI player (agent) is winning against its opponent. But if there is no critics then it will not improve its result "better to best" next time. So improving result critics providing an important role.

Question 3:

Write the PEAS description for the System which can identify CORONA positive patients.

Answer:

PEAS – Performance , Environment, Actuator, Sensors.

Performance – Less costly, Highest accuracy, non false positive reports

Environment – Lab, Hospital

Actuator – Testkit, Diagnosis machine

Sensors – Blood sample, Analysis machine

Question 4:

Consider the Environment of the popular game PUBG. Now fill the Table and justify your answer accordingly.

Answer:

Task environments of PUBG is following –

1) Partially observable
2) Sequential
3) Dynamic
4) Continuous
5) Multi-agent

Question 5:

Find the difference between the total numbers of expanded nodes while using IDS and BFS. Given that, branching factor = 3 and depth of tree =7.

Answer:

Here, b=3, d=7

For IDS,

$N(IDS) = (d)\ b + (d-1)\ b^2 + \ldots\ldots + (1)\ b^d$

$= 21 + 54 + 135 + 324 + 729 + 1458 + 2187$

$= 4908$

For BFS,

$N(BFS) = b + b2 + \ldots\ldots + b^n$

$= 3 + 9 + 27 + 81 + 243 + 729 + 2187$

$= 3279$

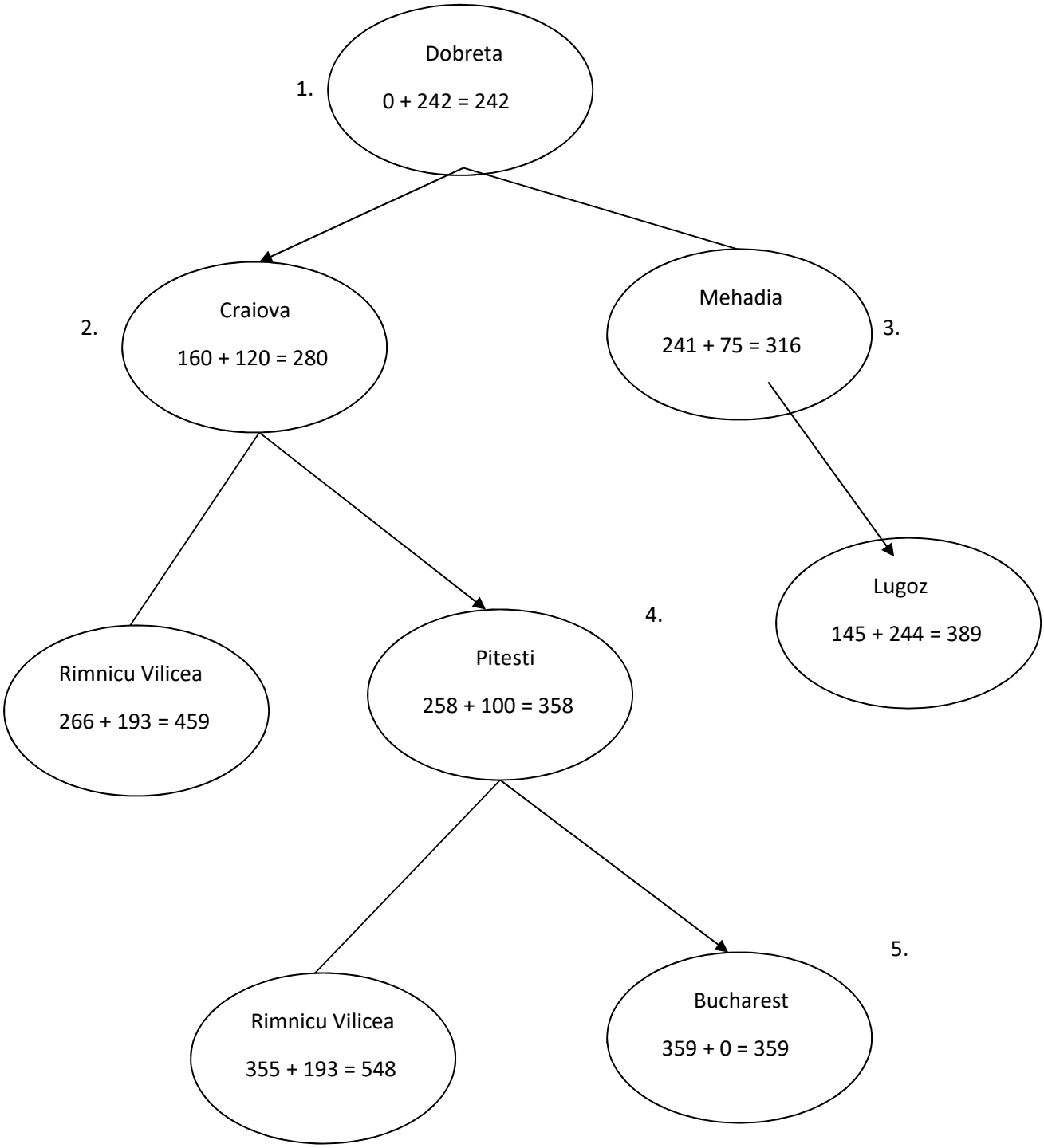
Required difference = (4908 – 3279)

= 1629

Question 6:

Consider the partial map of Romania given in Figure 1. Show the stages in A* search to reach the goal (Bucharest) from Drobeta using the Straight Line Distance Heuristic (HSLD) given in Table 2.

Answer:



Question 7:

How does hill climb algorithm work? Mention some advantages and disadvantages of hill climb algorithm.

Answer:

Hill climb racing:

Hill climb racing is simply a loop that continually moves in the direction of increasing value—that is, uphill. It terminates when it reaches a "peak" where no neighbor has a higher value. The algorithm does not maintain a search tree, so the data structure for the current node need only record the state and the value of the objective function.

Advantages:

- Makes rapid progress toward a solution.
- Usually quite easy to improve a bad state.
- It requires much less conditions than other search techniques.

Disadvantages:

- The success of hill climbing depends very much on the shape of the state-space landscape.
- Unfortunately hill climbing often gets stuck for various reasons such as: local maximas, ridges and plateaus.