PRIMEASIA UNIVERSITY

Department of Computer Science & Engineering

Final Examination, Summer Semester, 2020

Course No. : CSE 333 **Full Mark: 30**

Course Title: Artificial Intelligence **Time: 90 mins**

There are ***Four*** questions listed below. Answer any ***Three*** questions from them. Figures in the right-hand margin indicate full marks.

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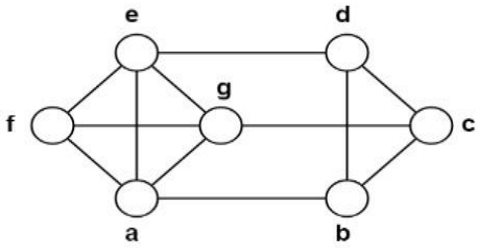
1. (a) Draw a decision tree from the following "Play Tennis" dataset which predicts if people play tennis or not. **[6]**

Day	Outlook	Temp.	Humidity	Wind	Play Tennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Weak	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cold	Normal	Weak	Yes
D10	Rain	Mild	Normal	Strong	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

(b) From the "Play Tennis" dataset mentioned above, find out the possibility of whether a player plays tennis in 'Sunny' condition or not using Naive Bayes Theorem. **[4]**

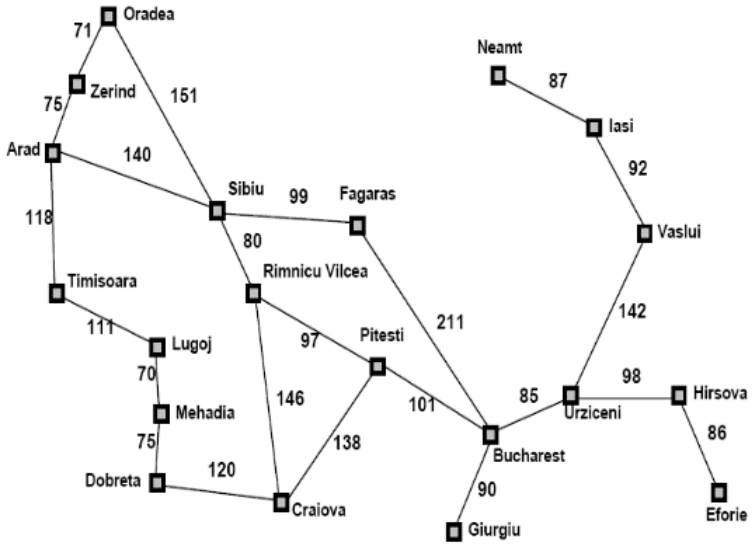
2. (a) Calculate the minimum number of colors required to color the following graph. Use Degree heuristic to color the graph. **[4]**



(b) Distinguish between supervised and unsupervised leaning with examples. **[4]**

(c) Two six-sided dice are rolled together. What is the probability that the sum of the two dice is five. **[2]**

3. (a) Find the route from **Oradea** to **Bucharest** using **Recursive Best-First Search (RBFS)**. Distances between the cities and estimations are given in the following figure. **[7]**



Straight-line distance to Bucharest	
Arad	366
Bucharest	0
Craiova	160
Dobreta	242
Eforie	161
Fagaras	178
Giurgiu	77
Hirsova	151
Iasi	226
Lugoj	244
Mehadia	241
Neamt	234
Oradea	380
Pitesti	98
Rimnicu Vilcea	193
Sibiu	253
Timisoara	329
Urziceni	80
Vaslui	199
Zerind	374

(b) When Uniform-Cost Search acts like Breadth-First Search? Justify your answer. **[3]**

4. The following 'fruit' dataset has data on 1000 pieces of fruit. They happen to be **Banana**, **Orange** or some **Other Fruit**. **[10]**

We know 3 characteristics about each fruit:
1. Whether it is Long
2. Whether it is Sweet and
3. If its color is Yellow.

Type	Long	Not Long	Sweet	Not Sweet	Yellow	Not Yellow	Total
Banana	400	100	350	150	450	50	500
Orange	0	300	150	150	300	0	300
Other Fruit	100	100	150	50	50	150	200
Total	500	500	650	350	800	200	1000

Now, classify an unknown fruit which is long, sweet and yellow using Naive Bayes Theorem.