CSC 290	Introduction to Artificial Intelligence	Midterm
PLEASE SUBMIT YOUR WORK ON E-Mail (Also keep a copy on sent items for just in case).		

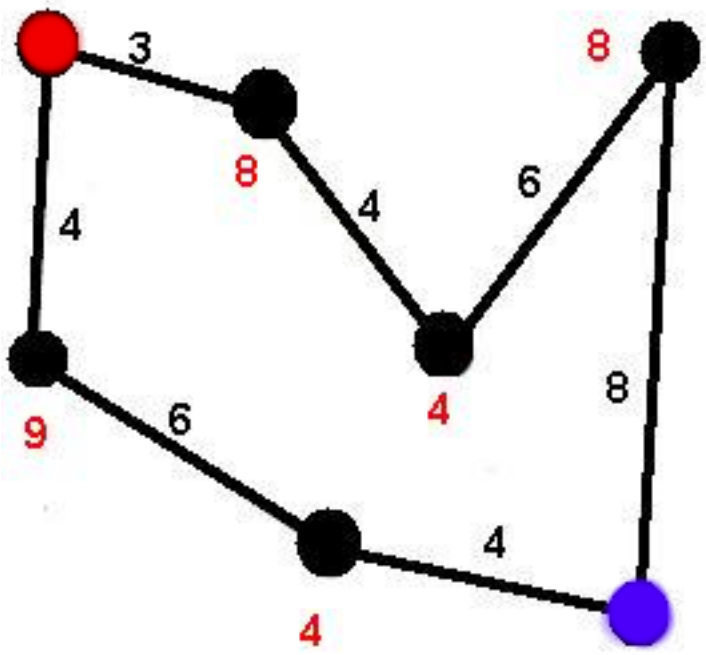
Due Date: Mar 8, 14.40 p.m. (No submissions after this time will be accepted)

The midterm is individual, so please do not make any information exchange or do not discuss about the answers or ask anybody for help except the instructor. You can use any Internet resources for reading, you can search for the answers on any search engine (like Google) or you can use any textbooks.

For all the parts below, please provide an answer with explanations. You can submit your answers by writing in a word processor, or you can write into paper and scan/take photo and submit as an attachment to your mail.

For Questions 1 - 3

For questions 1 to 3, use below map.



Red node indicates the starting node.
Blue node indicates the target node.
Black numbers on the edges, indicates the weight between two adjacent nodes.
Red numbers on the nodes, indicates the heuristic values of the nodes.

Questions

1) Explain (or show) the steps of Breadth First Search (BFS), Depth First Search and Uniform Cost Search on the given map above.
2) Show the steps of Iterative Deepening Search with initial depth = 0 and depth increase by 1 for each iteration. Compare the results with BFS and discuss the methods.
3) Show steps of A* algorithm for the given map above.
4) Consider the scenario given below and solve the problem with using any algorithms provided in constraint satisfaction problems (CSP) class. Show each step and the problem formulation with CSP algorithms.

You are asked to find a solution for class scheduling problem. You will schedule the courses into 3 days only (Let's assume Monday, Tuesday and Wednesday), you have one classroom to schedule, and one professor can teach one class at a time (Can give multiple classes in different days, but can not teach simultaneously). You have 5 courses and 3 professors with below conditions.
Course 1 - Intro to Java: between 15:00-16:00
Course 2 - Intro to Artificial Intelligence: between 15:30-16:30
Course 3 - Natural Language Processing: between 16:00-17:00
Course 4 – Mobile Programming: between 16:00-17:00
Course 5 - Machine Learning: between 16:30-17:30
Professor A, can teach Classes 3 and 4
Professor B, can teach Classes 2, 3, 4, 5
Professor C, can teach Classes 1, 2, 3, 4, 5

5) Consider the game rules below and draw a game tree for beads game. Also provide pruning for the tree, if it is available.
A score game is two player, turn based, competitive game. Game starts with 7 beads on the table. For each turn, players are free to take any number of beads from the table, but the maximum number they can take is the half (or floor of half) of the total beads on the table. The game ends when there is no beads left on the table and the last player, who takes beads, looses the game.

Grading

Each question is 20 points.
You can get partial points, so clearly indicate your approach, methodology or steps.
This is not a coding exam and you are not supposed to write any codes, however you can write some codes for crosschecking your results, you can also submit your codes but these codes will not be graded.