

CSCI3230 Fundamentals of Artificial Intelligence  
Written Assignment 2

Due date: 23:59:59 (GMT +08:00), November 9, 2020

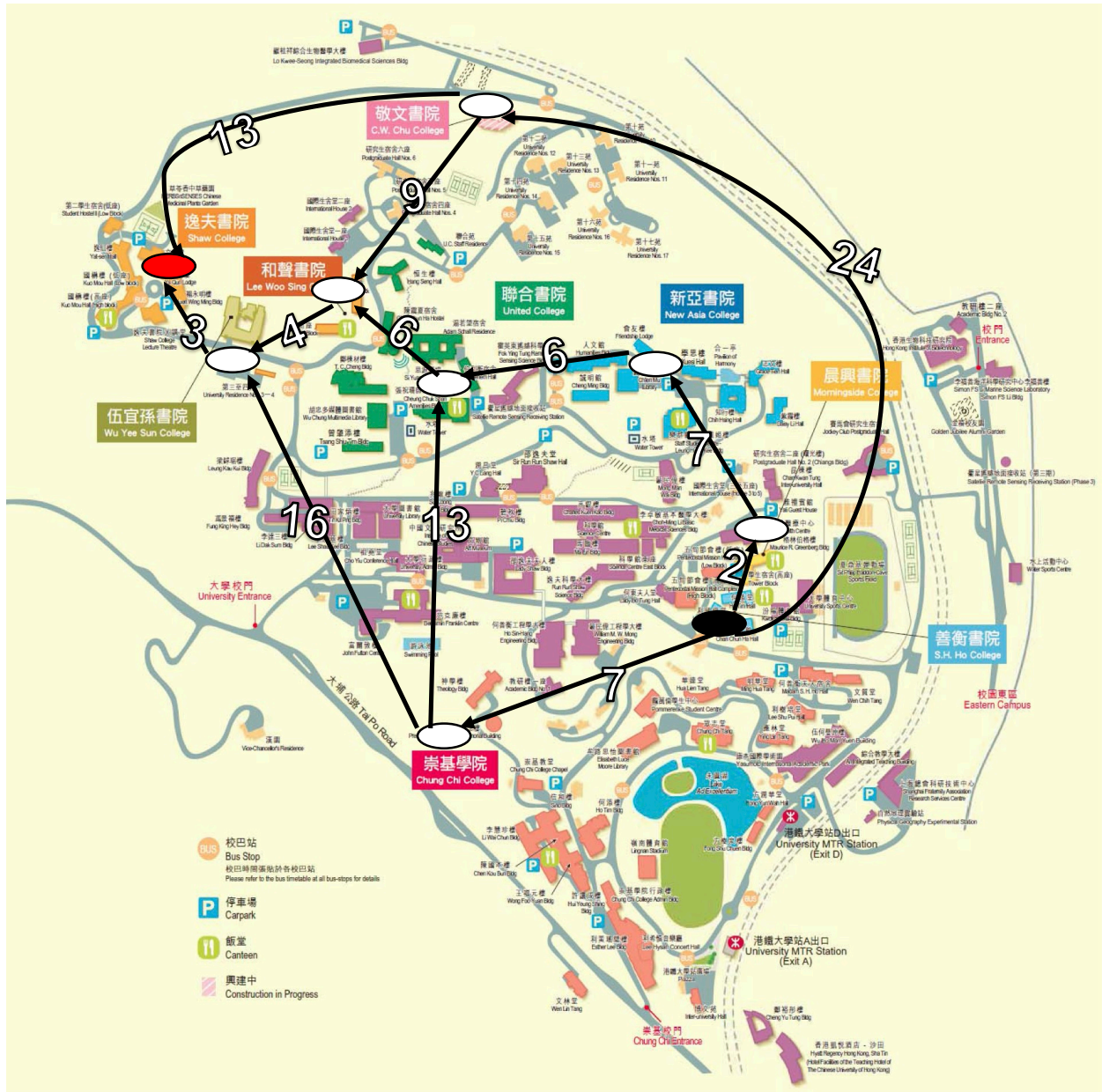
I. Questions

(a) Short Answer Questions: [30 marks]

- i. Name a stochastic search algorithm and describe it briefly.  
[4 marks]
- ii. In A\* algorithm, the score for each node is computed as  $f(n)=g(n)+h(n)$ . What is the meaning of  $g(n)$  and  $h(n)$  in the equation?  
[4 marks]
- iii. Besides  $\alpha$ - $\beta$  pruning, suggest two methods to deal with the limited source problem when applying Minimax algorithm.  
[4 marks]
- iv. Evaluate Breadth-First Search and Depth-First Search and explain briefly.  
[8 marks]
- v. For heuristics in A\* algorithm, prove that consistency implies admissibility but not the other way around.  
[10 marks]

(b) The distances between colleges in CU are shown in the map and the table respectively below. Use both the following **TWO** algorithms to search for a shortest path from S.H. Ho College (in black) to Shaw College (in red). Show all your steps and state the paths and costs clearly. [40 marks]

- Uniform-cost search with path cost [20 marks]
- Recursive Best First Search [20 marks]

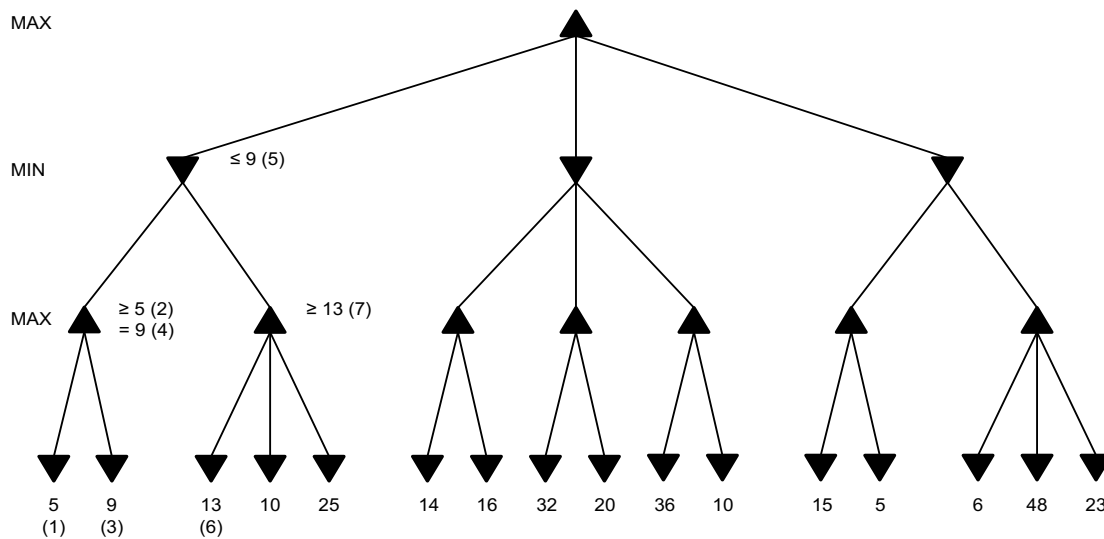


Heuristic Estimated Distances to Shaw College			
S.H. Ho College	24	United College	10
Morningside College	20	Lee Woo Sing College	6
Chung Chi College	17	Wu Yee Sun College	3
New Asia College	16	C.W. Chu College	12

- (c) **Describe** the concept of pruning and the basic principles of  $\alpha$ - $\beta$  pruning in minimax algorithm; **Show** the pruning steps with the following three-ply game tree.

(Please copy the game tree and indicate the steps of your search with brackets)

[30 marks]



## II. Assignment Submission

You **MUST** complete this assignment by using any one of the computer text editors (e.g. MS Word, WordPad, iWork Pages... etc.) and then save the document to PDF format with A4 printable page size. Scan version of the hand written work is **NOT** accepted. Please limit the file size of the PDF file less than 1MB.

You **MUST** submit the PDF file to the submission system on our course homepage (within CUHK network), otherwise, we will **NOT** mark your assignment.

## III. Important Points

You **MUST** STRICTLY follow these points:

- You **MUST** strictly follow the submission guidelines.
- Remember to type your FULL NAME, STUDENT ID on the assignment.
- Late submission will **NOT** be entertained according to our submission system settings.
- Plagiarism will be seriously punished.

## IV. Late Submission

According to the course homepage, late submission will lead to marks deduction.

No. of Days Late	Marks Deduction
1	10%
2	30%
3	60%
4 or above	100%