



MIDDLE EAST TECHNICAL UNIVERSITY  
NORTHERN CYPRUS CAMPUS

# **CNG 462**

## **Artificial Intelligence**

### **Assignment 1**

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## Version 1

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Applying UCS for treasure map:  
Starting Point: Cost is 0  
Starting Point - Stormy Ocean: Cost is 4  
Starting Point - Forest: Cost is 7  
Stormy Ocean - Desert: Cost is 8  
Forest - Treasure: Cost is 11
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Applying A* for treasure map:  
Starting Point: Cost is 0  
Starting Point - Stormy Ocean: Cost is 4  
Starting Point - Forest: Cost is 7  
Forest - Treasure: Cost is 11
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## Version 2

# UCS

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Applying UCS For Maze 1:
['[1, 1]', '[1, 2]']: Cost is 1
['[1, 1]', '[2, 1]']: Cost is 7
['[1, 1]', '[1, 2]', '[1, 3]']: Cost is 3
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]']: Cost is 11
['[1, 1]', '[2, 1]', '[3, 1]']: Cost is 18
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]']: Cost is 23
['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]']: Cost is 35
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]']: Cost is 36
['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]']: Cost is 55
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]']: Cost is 50
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]']: Cost is 54
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]']: Cost is 65
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]']: Cost is 77
['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]']: Cost is 76
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]']: Cost is 74
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]']: Cost is 78
['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]', '[5, 3]']: Cost is 98
['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]', '[6, 2]']: Cost is 103
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]']: Cost is 105
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[5, 3]']: Cost is 99
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 7]']: Cost is 83
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 5]']: Cost is 81
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 7]', '[1, 8]']: Cost is 89
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 7]', '[1, 8]', '[2, 8]']: Cost is 99
['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 7]', '[1, 8]', '[2, 8]', '[3, 8]']: Cost is 115

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[illegible]

A\*

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Applying A* for Maze 1:
['1, 1', '1, 2']: Cost is 9
['1, 1', '2, 1']: Cost is 13
['1, 1', '1, 2', '1, 3']: Cost is 10
['1, 1', '1, 2', '1, 3', '2, 3']: Cost is 18
['1, 1', '2, 1', '3, 1']: Cost is 24
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3']: Cost is 28
['1, 1', '2, 1', '3, 1', '4, 1']: Cost is 41
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4']: Cost is 40
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5']: Cost is 53
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4']: Cost is 61
['1, 1', '2, 1', '3, 1', '4, 1', '5, 1']: Cost is 60
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6']: Cost is 69
['1, 1', '2, 1', '3, 1', '4, 1', '5, 1', '5, 2']: Cost is 80
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4']: Cost is 79
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6']: Cost is 82
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4']: Cost is 110
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '5, 3']: Cost is 102
['1, 1', '2, 1', '3, 1', '4, 1', '5, 1', '5, 2', '5, 3']: Cost is 101
['1, 1', '2, 1', '3, 1', '4, 1', '5, 1', '5, 2', '6, 2']: Cost is 109
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6']: Cost is 83
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7']: Cost is 87
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 5']: Cost is 87
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8']: Cost is 94
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8']: Cost is 106
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8']: Cost is 120
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['1, 1', '2, 1', '3, 1', '4, 1', '5, 1', '6, 2', '7, 2']: Cost is 136
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4', '7, 4']: Cost is 138
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8']: Cost is 140
['1, 1', '2, 1', '3, 1', '4, 1', '5, 1', '6, 2', '7, 2', '7, 1']: Cost is 167
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4', '7, 4', '7, 5']: Cost is 172
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4', '7, 4', '8, 4']: Cost is 178
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8', '5, 8']: Cost is 165
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8', '5, 8', '6, 8']: Cost is 193
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8', '5, 8', '5, 7']: Cost is 189
['1, 1', '2, 1', '3, 1', '4, 1', '5, 1', '6, 2', '7, 2', '7, 1', '8, 1']: Cost is 205
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4', '7, 4', '7, 5', '7, 6']: Cost is 207
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4', '7, 4', '8, 4', '8, 3']: Cost is 217
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8', '5, 8', '5, 7', '5, 6']: Cost is 212
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8', '5, 8', '6, 8', '7, 8']: Cost is 230
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4', '7, 4', '7, 5', '7, 6', '7, 7']: Cost is 243
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '4, 4', '5, 4', '6, 4', '7, 4', '8, 4', '8, 3', '9, 3']: Cost is 255
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8', '5, 8', '6, 8', '7, 8', '8, 8']: Cost is 260
['1, 1', '1, 2', '1, 3', '2, 3', '3, 3', '3, 4', '3, 5', '3, 6', '2, 6', '1, 6', '1, 7', '1, 8', '2, 8', '3, 8', '4, 8', '5, 8', '6, 8', '7, 8', '7, 7']: Cost is 264
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# BFS

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Applying BFS for Maze 1:
Path: ['[1, 1]']
Path: ['[1, 1]', '[1, 2]']
Path: ['[1, 1]', '[2, 1]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]', '[5, 3]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]', '[6, 2]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]', '[6, 2]', '[7, 2]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]']
Path: ['[1, 1]', '[2, 1]', '[3, 1]', '[4, 1]', '[5, 1]', '[5, 2]', '[6, 2]', '[7, 2]', '[7, 1]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 7]']
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Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 5]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]', '[7, 4]', '[7, 5]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]', '[7, 4]', '[8, 4]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 7]', '[1, 8]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]', '[7, 4]', '[7, 5]', '[7, 6]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]', '[7, 4]', '[8, 4]', '[8, 3]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[3, 5]', '[3, 6]', '[2, 6]', '[1, 6]', '[1, 7]', '[1, 8]', '[2, 8]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]', '[7, 4]', '[7, 5]', '[7, 6]', '[7, 7]']
Path: ['[1, 1]', '[1, 2]', '[1, 3]', '[2, 3]', '[3, 3]', '[3, 4]', '[4, 4]', '[5, 4]', '[6, 4]', '[7, 4]', '[8, 4]', '[8, 3]', '[9, 3]']
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