Artificial Intelligence
CSC 361

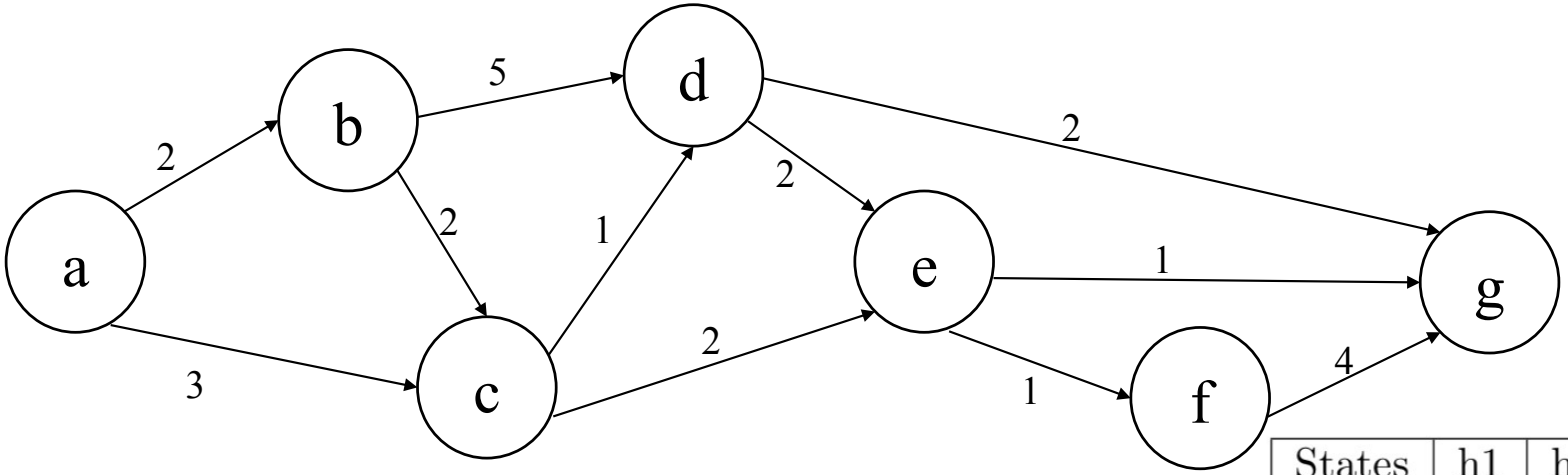
Tutorial
Informed Search

Question 1:Consider the search space of Figure 1, where state **a** is the initial state and **g** is the goal state. Table 1 gives a list of heuristic functions for this space.

1. For each function, tell whether it is admissible.

States	h1	h2	h3	h4	h5	h6
a	6	6	5	5	7	5
b	3	5	2	3	3	4
c	2	3	1	2	2	2
d	0	2	3	1	1	1
e	1	1	1	1	1	1
f	1	2	1	1	1	1
g	0	0	0	1	0	0

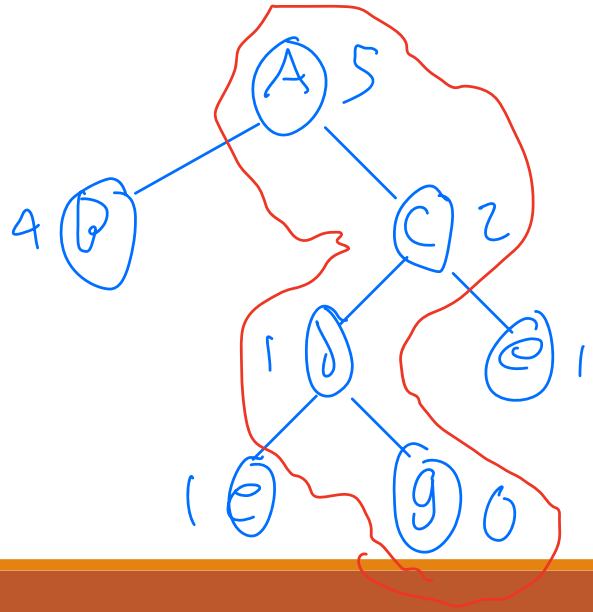
Table 1: Heuristics for the search space of Figure 1



States	h1	h2	h3	h4	h5	h6
a	6	6	5	5	7	5
b	3	5	2	3	3	4
c	2	3	1	2	2	2
d	0	2	3	1	1	1
e	1	1	1	1	1	1
f	1	2	1	1	1	1
g	0	0	0	1	0	0

Answer

1. Applying the definitions, we get:
   - Admissible functions: h1, h2, h6.



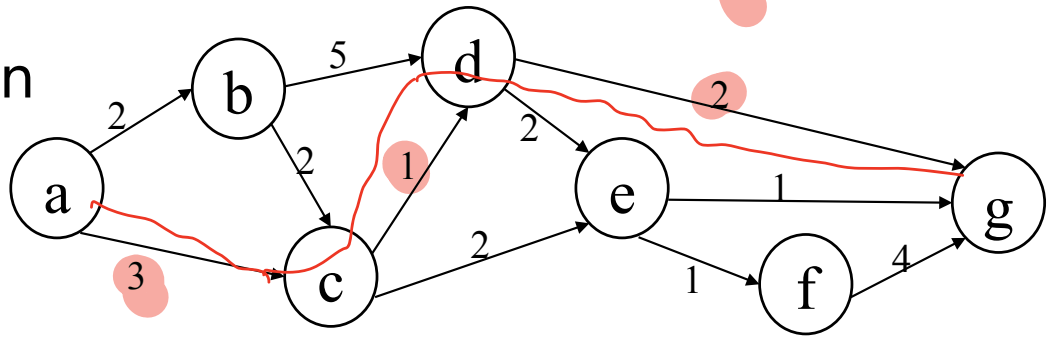
Fringe
~~A~~
~~C~~
B
~~D~~
E
E

O.E
A
C
J

Question 2:

Use $\mathbf{h_6}$ to Find:

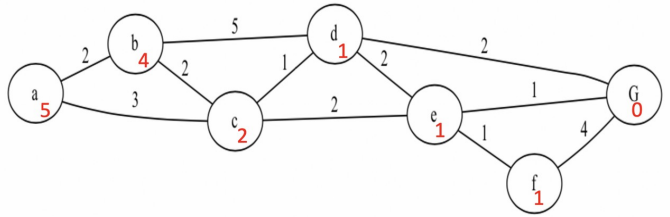
- the order of node expansion
- the final fringe
- the solution path,
- the solution cost



Using each of the following 2 strategies:

1. Greedy best first search
2. A*

Greedy best-first



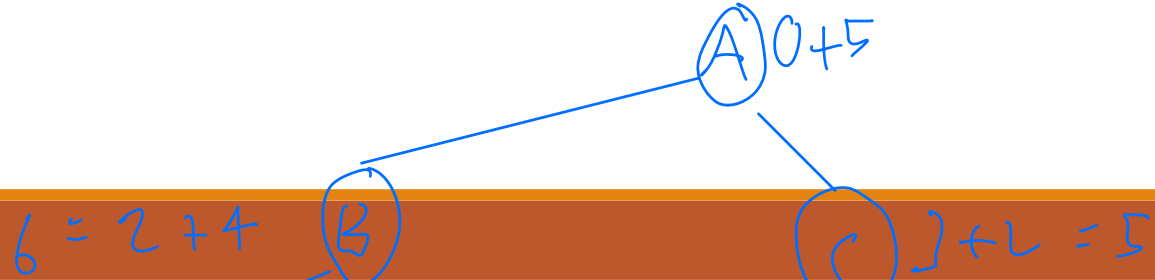
Tree Search	
the order of node expansion	**a, c, d.**
the final fringe	**{e, e, b}.**
the solution path,	**(a, c, d, g)**
the solution cost	**6**

Fringe

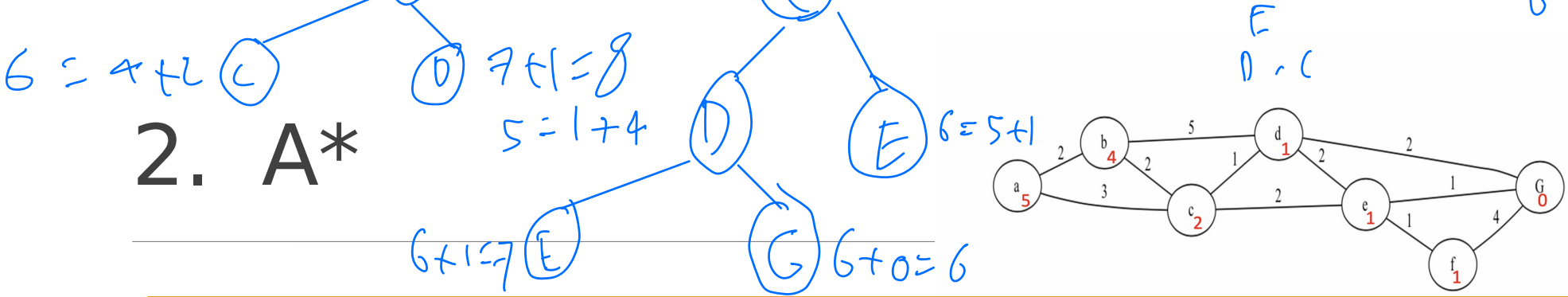
~~A~~
~~B~~ ~~D~~
~~E~~
G

O. E

A
C
D



2. A*



Tree Search	
the order of node expansion	**a, c, d, b, e**
the final fringe	**{c_6, g_6, e_7, f_7, d_8}.**
the solution found,	**(a, c, d, g).**
the cost of the solution	**6**

Question 2

1. Describe a heuristic function that will make A* search behave like uniform-cost search for a given cost function.
   - **h = 0 for all nodes.**

2. Describe a heuristic function that will make greedy search behave like breadth- first search
   - **The depth function.**

تفرح اللي كنره دبيت أقل