Exam 16/02/2015

Consider the search problem represented in the following graph. It has start state S and goal state G. Transition costs are shown as numbers on the arrows. Heuristic values are shown below each state.

1. Draw the A* search tree
2. Mark the expansion order
3. Show the optimal solution path

The graph:

- A, $h=2$
- D, $h=1$
- S, $h=3$
- B, $h=2$
- E, $h=1$
- G, $h=0$
- C, $h=2$
- F, $h=1$

Edges: S→A (1), S→B (2), S→C (3), A→D (5), B→D (2), B→E (1), C→E (3), C→F (2), D→G (1), E→G (3), F→G (2)

A* search tree:

① S: $h=3$, $g=0$, $f=0+3=3$

② A: $h=2$, $g=1$, $f=1+2=3$ (edge 1)
③ B: $h=2$, $g=2$, $f=5$ (edge 2)
⑤ C: $h=2$, $g=3$, $f=5$ (edge 3)

A → D: $h=3$, $g=5$, $f=8$ (edge 5)

B → D: $h=1$, $g=4$, $f=5$ ⑥ (edge 2)
B → E: $h=1$, $g=3$, $f=4$ ④ (edge 1)

C → E: $h=1$, $g=6$, $f=7$ (edge 3)
C → F: $h=1$, $g=5$, $f=6$ (edge 2)

D → G: $h=0$, $g=5$, $f=5$ ⑦ (edge 1) — goal

E → G: $h=0$, $g=6$, $f=6$ (edge 3)