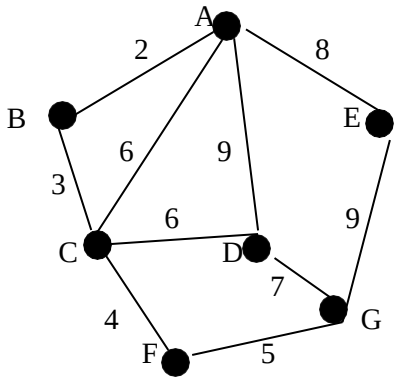
CS547: Artificial Intelligence **ASSIGNMENT 3** School of Computer Science
6 points Western Illinois University

Professor: Byoung Jik Lee

1. (**due: 6 PM, 10/02/2020)** Consider the following search problem. The starting state is **A** and the goal state is **G**. Ignore duplicated states.



The heuristic ***h1*** value for each state is given as below.

state	A	B	C	D	E	F	G
heuristic *h* value	12	10	5	6	7	1	0

(1-1). (1 point) Apply Greedy-Best Search to find a solution.

- You need to show the process of each action step by step.
  - You need to construct the search space for each selection
- Write the state which you select to expand and write why you choose it.
- What is the order of selected expanding states when you apply this search?
- What is your final solution (the sequence of states to reach the goal)?

(1-2) (1.5 points) Apply A* algorithm with ***h1*** to find a solution.

- You need to show the process of each action step by step.
  - You need to construct the search tree for each selection
- Write the state which you select to expand and write why you choose it.
- What is the order of selected expanding states when you apply this search?
- What is your final solution (the sequence of states to reach the goal)?
- Write the number of generated states.

(1-3) (1.5 points) Apply A* algorithm with ***h2*** to find a solution.
The heuristic ***h2*** value for each state is given as below.

state	A	B	C	D	E	F	G
heuristic *h* value	12	11	9	6	8	4	0

- You need to show the process of each action step by step.
    - You need to construct the search tree for each selection
- Write the state which you select to expand and write why you choose it.
- What is the order of selected expanding states when you apply this search?
- What is your final solution (the sequence of states to reach the goal)?
- Write the number of generated states.

(2) (2 points) **(due: 6 pm, 10/08/2020)** *Program the above problem for* A* algorithm with ***h1***. You can use any programming language and any data structures.

You need to display the steps of running your program, i.e., you need to print the running process of your program. When you select one node out of nodes pool by A* algorithm, you need to print why you choose that node by printing the values of function *f(n) with h(n) and g(n).*

Submit your printed source code and output result printed by running your program. Submit your source code.