

## Exercises: Shortest Paths

**Warning:** The hard deadline has passed. You can attempt it, but **you will not get credit for it**. You are welcome to try it as a learning exercise.

To specify an array or sequence of values in an answer, you must separate the values by a single space character (with no punctuation and with no leading or trailing whitespace). For example, if the question asks for the first ten powers of two (starting at 1), the only accepted answer is:

1 2 4 8 16 32 64 128 256 512

If you wish to discuss a particular question and answer in the forums, please post the entire question and answer, including the seed (which is used by the course staff to uniquely identify the question) and the explanation (which contains the correct answer).

☐ In accordance with the Coursera Honor Code, I (Atul Gupta) certify that the answers here are my own work.

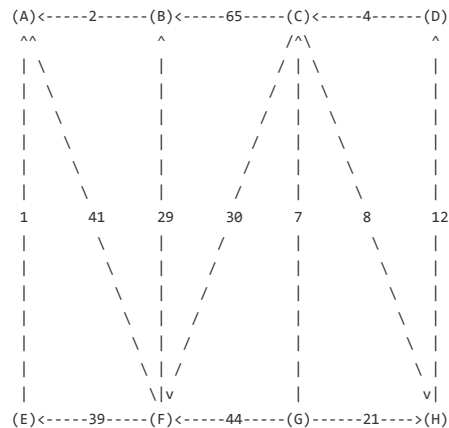
### Question 1

(seed = 616734)

Consider the following edge-weighted digraph with 8 vertices and 13 edges.

v->w	weight
B->A	2
C->B	65
C->F	30
C->H	8
D->C	4
E->A	1
F->A	41
F->B	29
F->E	39
G->C	7
G->F	44
G->H	21
H->D	12

Here is a graphical representation of the same edge-weighted digraph:



Suppose that you run Dijkstra's algorithm to compute the shortest paths from G to every other vertex. Give the sequence of values in the distTo[]

array immediately after vertex F is relaxed.

Here is the distTo[] array before G is relaxed:

v	A	B	C	D	E	F	G	H
distTo[v]	-	-	-	-	-	-	0	-

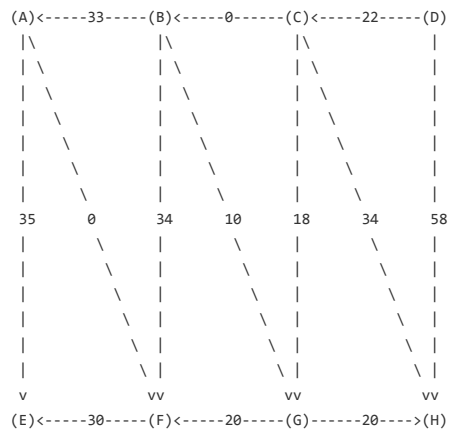
## Question 2

(seed = 296252)

Consider the following edge-weighted DAG with 8 vertices and 13 edges.

v->w	weight
A->E	35
A->F	0
B->A	33
B->F	34
B->G	10
C->B	0
C->G	18
C->H	34
D->C	22
D->H	58
F->E	30
G->F	20
G->H	20

Here is a graphical representation of the same edge-weighted digraph:



Suppose that you run the acyclic shortest paths algorithm to compute the shortest paths from D to every other vertex using the following topological order:

D C B G H A F E

Give the sequence of values in the distTo[] array immediately after vertex A is relaxed.

Here is the distTo[] array before D is relaxed:

v	A	B	C	D	E	F	G	H
distTo[v]	-	-	-	0	-	-	-	-

### Question 3

(seed = 621114)

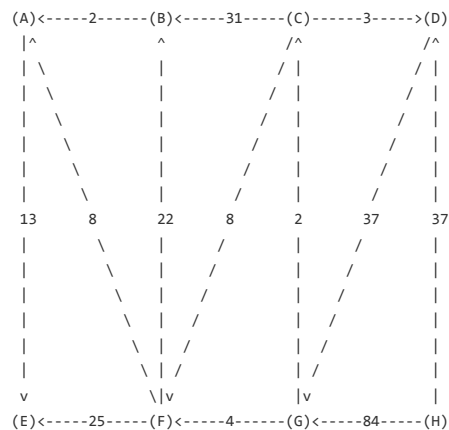
Consider the following edge-weighted digraph with 8 vertices and 13 edges.

```

v->w  weight
-----
A->E   13
B->A    2
C->D    3
C->B   31
C->F    8
D->G   37
F->A    8
F->B   22
F->E   25
G->F    4
G->C    2
H->D   37
H->G   84

```

Here is a graphical representation of the same edge-weighted digraph:



Suppose that you run the Bellman-Ford algorithm to compute the shortest paths from H to every other vertex. Give the sequence of values in the `distTo[]` array immediately after the end of the third pass of the algorithm. Each pass consists of relaxing the 13 edges in the order given above.

Here is the `distTo[]` array before the beginning of the first pass:

```

      v    A    B    C    D    E    F    G    H
-----
distTo[v]  -    -    -    -    -    -    -    0

```

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You cannot submit your work until you agree to the Honor Code. Thanks!