Exercises: Maximum Flow

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 o
nly 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).
```
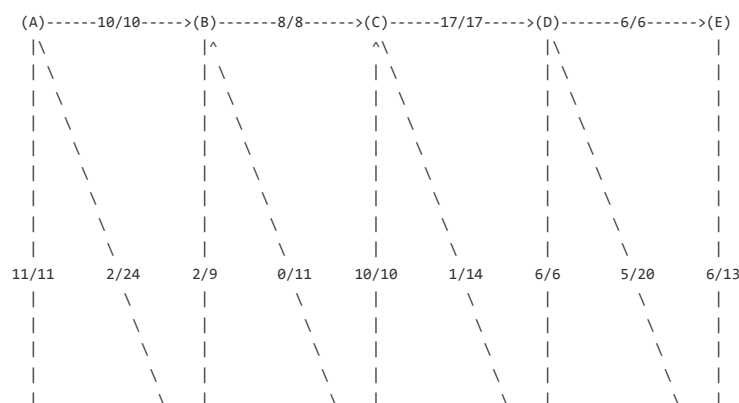
☐ **In accordance with the Coursera Honor Code, I (Atul Gupta) certify that the answers here are my own work.**
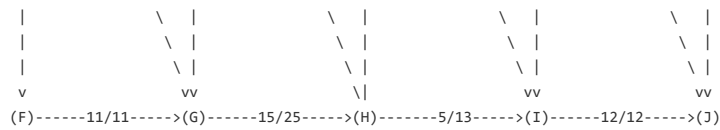
Question 1

```
(seed = 128390)
Consider the flow network with 10 vertices and 17 edges:

    edge   flow  /  capacity
    -----------------------
    A->B     10  /  10
    A->F     11  /  11
    A->G      2  /  24
    H->B      0  /  11
    B->C      8  /  8
    B->G      2  /  9
    H->C     10  /  10
    C->D     17  /  17
    C->I      1  /  14
    D->I      6  /  6
    D->E      6  /  6
    D->J      5  /  20
    E->J      6  /  13
    F->G     11  /  11
    G->H     15  /  25
    H->I      5  /  13
    I->J     12  /  12


Here is a graphical representation of the same flow networ
k:


        (A)------10/10----->(B)-------8/8------>(C)------17/17----->(D)-------6/6------>(E)
         |\                  |^                  ^\                  |\                  |
         | \                 | \                 | \                 | \                 |
         |  \                |  \                |  \                |  \                |
         |   \               |   \               |   \               |   \               |
         |    \              |    \              |    \              |    \              |
         |     \             |     \             |     \             |     \             |
         |      \            |      \            |      \            |      \            |
         |       \           |       \           |       \           |       \           |
         |        \          |        \          |        \          |        \          |
        11/11    2/24      2/9        0/11      10/10      1/14      6/6       5/20      6/13
         |         \         |          \        |          \        |          \        |
         |          \        |           \       |           \       |           \       |
         |           \       |            \      |            \      |            \      |
         |            \      |             \     |             \     |             \     |
         |             \    |              \    |              \    |              \    |
```

```
      |           \  |              \  |              \  |              \  |
      |            \ |               \ |               \ |               \ |
      |             \|                \|                \|                \|
      v             vv                vv                vv                vv
    (F)------11/11---->(G)------15/25---->(H)-------5/13---->(I)------12/12---->(J)
```

Suppose that you are computing a max flow from A to J.
Starting from the given flow of value 23, give the sequence of vertices on the
next (and final) augmenting path discovered by the Ford-Fulkerson algorithm.

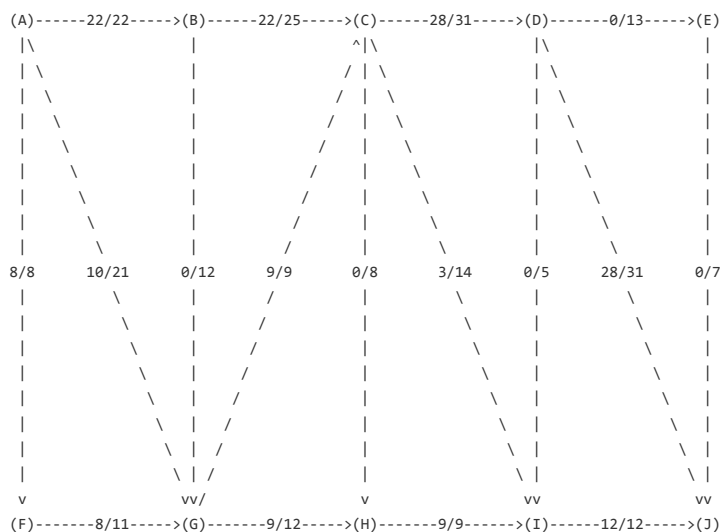## Question 2

(seed = 841593)
Consider the flow network with 10 vertices and 17 edges:

```
    edge   flow /  capacity
    ------------------------
    A->F     8  /   8
    A->G    10  /  21
    A->B    22  /  22
    B->G     0  /  12
    B->C    22  /  25
    G->C     9  /   9
    C->I     3  /  14
    C->D    28  /  31
    C->H     0  /   8
    D->J    28  /  31
    D->E     0  /  13
    D->I     0  /   5
    E->J     0  /   7
    F->G     8  /  11
    G->H     9  /  12
    H->I     9  /   9
    I->J    12  /  12
```

Here is a graphical representation of the same flow networ
k:

```
   (A)------22/22----->(B)------22/25----->(C)------28/31----->(D)-------0/13----->(E)
    |\                  |                 ^|\                   |\                  |
    | \                 |                / | \                  | \                 |
    |  \                |               /  |  \                 |  \                |
    |   \               |              /   |   \                |   \               |
    |    \              |             /    |    \               |    \              |
    |     \             |            /     |     \              |     \             |
    |      \            |           /      |      \             |      \            |
    |       \           |          /       |       \            |       \           |
    |        \          |         /        |        \           |        \          |
    |         \         |        /         |         \          |         \         |
    8/8       10/21     0/12    9/9        0/8       3/14       0/5       28/31      0/7
    |           \       |      /           |           \        |           \       |
    |            \      |     /            |            \       |            \      |
    |             \     |    /             |             \      |             \     |
    |              \    |   /              |              \     |              \    |
    |               \   |  /               |               \    |               \   |
    |                \  | /                |                \   |                \  |
    |                 \ |/                 |                 \  |                 \ |
    v                  vv/                 v                  vv                  vv
   (F)-------8/11----->(G)-------9/12----->(H)-------9/9------>(I)------12/12----->(J)
```

```
The flow given above is a maxflow from A to J. What is the corresponding mincut?
List the vertices on the s side of mincut in alphabetical order.
```

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

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