# **ECE 520 Project description**

#### About this project:

The project in this semester has some of the negative weights in all the examples. Your design judge whether there is a negative cycle or not. If there is a negative cycle, your design should output something like "Negative cycle exists". If there is no negative cycle, your design should output just like Project15technical.pdf told you.

#### About .mem files:

These files are used to initial your memory.

Compared with .dat files, I changed the format in Graph.dat a little bit.

```
16
                                      000000000000000100000000000000006
2
    27
                                   2
                                      0000000000000002000000000000000007
    38
                                   3
                                      000000000000000300000000000000000
    49
                                   4
                                      000000000000000400000000000000000
    5 10
                                      000000000000000500000000000000000A
                                      1 2 2 10 4 5 FF FF FF FF FF FF FF FF FF
                                      0102020A0405FFFFFFFFFFFFFFFFFF
    223142 FF FF FF FF FF FF FF FF FF
                                      020203010402FFFFFFFFFFFFFFFFF
    3154 FF FF FF FF FF FF FF FF FF FF
                                   9
                                      4323395 FF FF FF FF FF FF FF FF
                                  10
                                      04030203030905FFFFFFFFFFFFFF
11
    521 FE 36 FF FF FF FF FF FF FF FF FF
                                  11
                                      050201FE0306FFFFFFFFFFFFFFFF
12
                                  12
                                      Graph_small.dat
                                         Graph_small.mem
```

Address Index Part: each number takes 64 bits wide, each entry stores address information for one vertex.

Adjacent List Part: each number takes 8 bits wide; each entry stores up to information for 8 daughter vertices (note each daughter vertex includes its vertex number and edge weight).

The blank between Address Index Part and Adjacent List Part is presented as 32bit 0. Also, 0, at the end of .dat file, is presented as 32bit 0.

Input.mem is very similar to Input.dat.

### About multipath solution:

In this design, you would come up with many solutions which as the same shortest path. In this case, you should choose the smallest index number and smallest

number of indexes in your shortest path.

For example, if the shortest path from 1 to 10 is 5, you may get these three paths: 1 -> 4 -> 10 or 1 -> 5 -> 10 or 1 -> 2 -> 3 -> 10. We should choose 1 -> 4 -> 10 path, because it has smallest number of indexes and index 4 is smaller than 5.

#### Files description:

#### These files (HEX files) are used to initial your SRAMs:

Graph\_small\_wNeg.mem: small graph in hex with negative cycles

Graph\_small\_wNeg.mem: small graph in hex without Negative cycles

Input\_small.mem: small graph input data in hex

Graph\_large\_wNeg.mem: large graph in hex with negative cycles

Graph\_large\_wNeg.mem: large graph in hex without Negative cycles

Input\_large.mem: large graph input data in hex

## These files (decimal files) are used for high level code (if you need to use them):

Graph small wNeg.dat: small graph in decimal with negative cycles

Graph\_small\_wNeg.dat: small graph in decimal without Negative cycles

Input\_small.dat: small graph input data in decimal

Graph\_large\_wNeg.dat: large graph in hex with negative cycles

Graph\_large\_wNeg.dat: large graph in hex without Negative cycles

Input\_large.dat: large graph input data in hex

# These files are expected output files in decimal (we use these to test your results):

Output\_small\_wNeg.dat: expected output file with negative cycles

Output\_small\_woNeg.dat: expected output file without negative cycles