Project: Project **6** computes the shortest path to all vertexes of a graph from a distinguished vertex that serves as the origin. The input file specifies the graph. The output file records the shortest paths to all vertexes.

Program Files:

File	Description
p06.cpp	File **p06.cpp** contains functions that process command line arguments and exercise class *Graph*.
Graph06.h	File **Graph06.h** defines **class** *Graph*. **class** *Graph* defines member data and functions to manage a graph including finding the shortest path. A queue is used to find the shortest path and **class** *Graph* is derived from **class** *Queue*.
Graph06.cpp	File **Graph06.cpp** implements **class** *Graph*.
Queue06.h	File **Queue06.h** defines **class** *Queue*. **class** *Queue* defines member data and functions for a queue.
Queue06.cpp	File **Queue06.cpp** implements **class** *Queue*.
***06.h**	All files containing class definitions must have the suffix **06.h**.
***06.cpp**	All files containing member function implementations must have the suffix **06.cpp**.
p06make	File **p06make** contains instructions for program **p06**. Instructions are written for the UNIX utility ***make***. Program **p06** is contained in file **p06**.

Command Line: Project **7** can be invoked with zero, one, or two program parameters. The first program parameter is the input file name. The second parameter is the output file name. Sample command lines together with corresponding actions by program **p06** are shown below. Boldfaced type indicates data entered at the keyboard by the user.

$ **p06**
Enter the input file name: **i06.dat**
Enter the output file name: **o06.dat**

$ **p06 i06.dat**
Enter the output file name: **o06.dat**

$ **p06 i06.dat o06.dat**

Input File: File **i06.dat** contains the number of vertexes, the distinguished vertex, *s*, from which the shortest path to every other vertex is computed, and a list of edges. (see Figure 1.). A representative Graph is contained in file **~tt/cs3613/i06.dat** which you may copy to your home directory to test your project.

File **i06.dat** contains integers as shown in Figure 1. The first integer is the number of vertexes. The next integer is the distinguished vertex *s*. Remaining integers are in pairs. Each pair represents a directed edge. The first integer in the pair is the origin of the edge and the second integer is the destination of the edge. Vertexes are numbered starting with vertex 0.

Output File: The output consists of three columns titled *vertex*, *distance*, and *path*. List the vertexes in ascending order in the column labeled *vertex*. Print the distance to the vertex listed in the first column from the distinguished vertex in the column titled *distance*. List the path from the distinguished vertex to the vertex in the first column in the column labeled *path*. The Table in Figure 2 could have been produced by program **p06** given edges listed in Figure 1.

```
7
2
0       1
0       3
1       4
2       0
2       5
3       2
3       5
3       6
3       1
4       6
6       5
```

Figure 1. Input file format

Vertex	Distance	Path			
0	1	2	0		
1	2	2	0	1	
2	0	2			
3	2	2	0	3	
4	3	2	0	1	4
5	1	2	5		
6	3	2	0	3	6

Figure 2. Output file format.