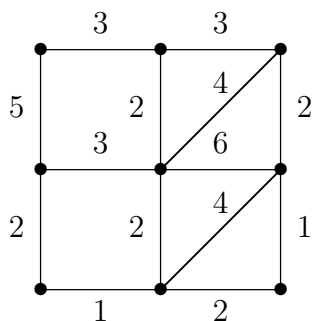


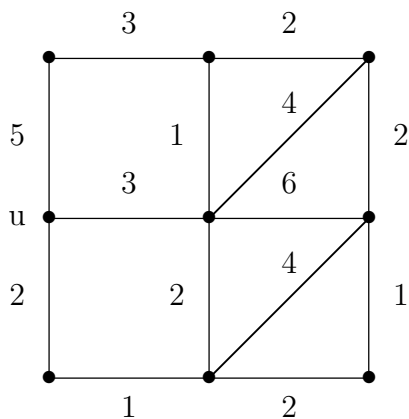
**Math 485 Homework 8**  
**Fall 2007**  
**Due: Friday, November 2**

In all the problems, indicate how you arrived at your answer and explain your work.

1. In class we discussed Prim's algorithm. Prove that, given a weighted connected graph  $G$ , Prim's algorithm outputs a minimum weight spanning tree of  $G$ .
2. (a) Explain how Kruskal's algorithm can be modified to find a maximum weight spanning tree.  
 (b) Use your algorithm from part (a) to find a **maximum** weight spanning tree in the graph below:



3. Find the shortest distance  $d(u, v)$  from  $u$  to all the other vertices  $v$  in the graph below using Dijkstra's algorithm.



4. Show that the following algorithm correctly computes the diameter of a tree  $T$ : Let  $u$  be any vertex in  $T$ . Use the Breadth-First Search algorithm to find a vertex  $v$  at maximum distance from  $u$ . Then use Breadth-First Search to find a vertex  $w$  at maximum distance from  $v$ . Show that the diameter is  $d(v, w)$ .