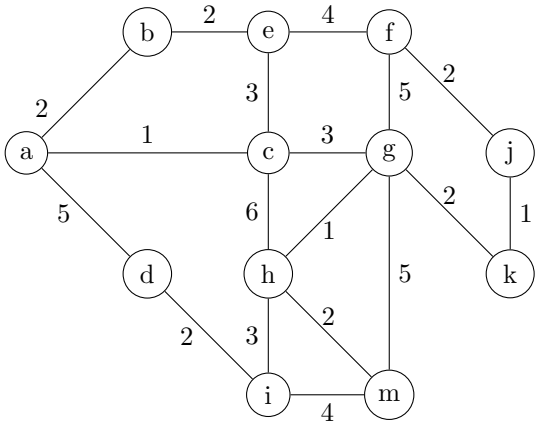
CSCB63 Tutorial 7 — Minimum Spanning Trees

Consider the following graph $G = (V, E)$ and its adjacency list representation.



a:	(b,2), (c,1), (d,5)
b:	(a,2), (e,2)
c:	(a,1), (e,3), (g,3), (h,6)
d:	(a,5), (i,2)
e:	(b,2), (c,3), (f,4)
f:	(e,4), (g,5), (j,2)
g:	(c,3), (f,5), (h,1), (k,2), (m,5)
h:	(c,6), (g,1), (i,3), (m,2)
i:	(d,2), (h,3), (m,4)
j:	(f,2), (k,1)
k:	(g,2), (j,1)
m:	(g,5), (h,2), (i,4)

1. Run Prim's algorithm on G.
2. Run Kruskal's algorithm on G.

Solution sketch:

1. Prim's: If the start vertex is a, the following edges are selected in this order:
   $\{a, c\}$, $\{a, b\}$, $\{b, e\}$, $\{c, g\}$, $\{g, h\}$, $\{g, k\}$, $\{k, j\}$, $\{j, f\}$, $\{h, m\}$, $\{h, i\}$, $\{i, d\}$.
2. Kruskal's:
   All edges sorted by weight: $(a, c, 1)$, $(g, h, 1)$, $(j, k, 1)$, $(a, b, 2)$, $(b, e, 2)$, $(d, i, 2)$, $(f, j, 2)$, $(g, k, 2)$, $(h, m, 2)$, $(c, e, 3)$, $(c, g, 3)$, $(h, i, 3)$, $(e, f, 4)$, $(i, m, 4)$, $(a, d, 5)$, $(f, g, 5)$, $(g, m, 5)$, $(c, h, 6)$
   Select edges in this order:
   $(a, c, 1)$, $(g, h, 1)$, $(j, k, 1)$, $(a, b, 2)$, $(b, e, 2)$, $(d, i, 2)$, $(f, j, 2)$, $(g, k, 2)$, $(h, m, 2)$, $(c, g, 3)$, $(h, i, 3)$,