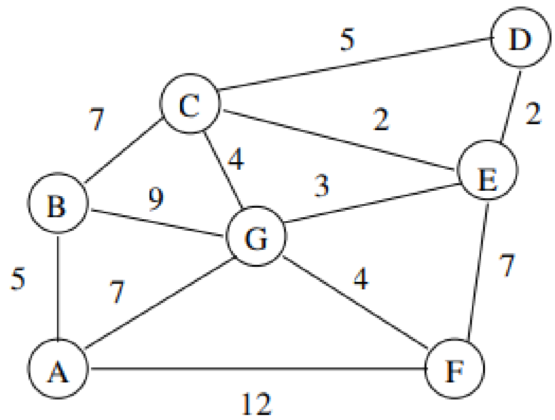
Prim Worksheet



Start with vertex A in a set by itself T = {A} and with Tprim empty. At each step, choose a vertex not in T that can be joined to a vertex in T using an edge of least cost. Add the vertex to T and the edge to Tprim. Show T and Tprim at the end of each iteration

I1 T{A,B} Tprim = {5}

I2 T{A,B,G} Tprim = {5,7}

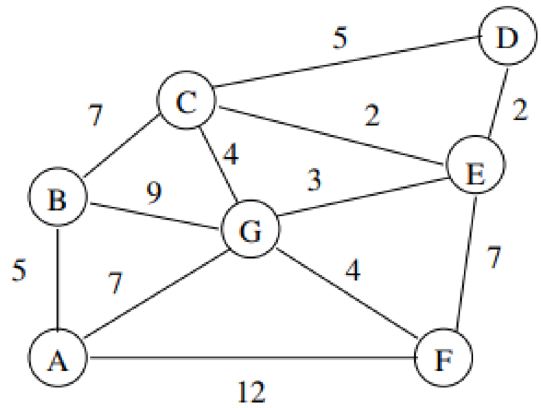
I3 T{A,B,G,E} Tprim = {5,7,3}

I4 T(A,B,G,E,C} Tprim = {5,7,3,2}

I5 T{A,B,G,E,C,D} Tprim = {5,7,3,2,2}

I6 T(A,B,G,E,C,D,F} Tprim = {5,7,3,2,2,4}

Kruskal Worksheet



1. List the edges in non-decreasing order of weight.

E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12
DE 2	CE 2	GE 3	GF 4	GC 4	CD 5	AB 5	BC 7	AG 7	EF 7	BG 9	AF 12

2. Start with spanning tree T = {}. For each edge in order, check whether it creates a cycle? If not, add it to T.

Edge	Cycle?
E1	No
E2	No
E3	No
E4	No
E5	Yes
E6	Yes
E7	No
E8	No
E9	Yes
E10	Yes
E11	Yes
E12	Yes

Ackermann's Function

The Ackermann's function is defined by the following recurrence relation:

A(1, j) = 2j for j ≥ 1

A(i, 1) = A(i − 1, 2) for i ≥ 2

A(i, j) = A(i − 1, A(i, j − 1)) for i, j ≥ 2

Use the recurrence relation to fill up as many values as you can in the table below.

Start with Row 1 and work your way up to larger values of i and j.

Ackermann Table					
i/j	1	2	3	4	…
1	2^1	2^2	2^3	2^4	
2	2^2	2^4	2^{16}	2^{65536}	
3	2^4	2^{16}	2^{65536}		
…					

What pattern emerges in Row 2?

The next element is 2^x where x is the value to it's left cell. For example, $2^2 \rightarrow 2^{2^2} \rightarrow 2^{2^{2^2}}$ …