problem 13

Here's the weight matrix of a connected graph.

	A	B	C	D	E	F
A						
B	24					
C	∞	5				
D	25	∞	10			
E	∞	4	2	∞		
F	∞	∞	3	9	6	

Without drawing the graph, use Prim's algorithm to find a minimal spanning tree. With all the status/link/cost stuff. It might get tiresome to type but at least show the details for round 1.

List all the edges in the min spanning tree and find its total weight.

You could start with any vertex. But to make it easier for me everyone should start at the same vertex.

AND I CHOOSE VERTEX D to be the starting vertex. NOT A.

solution 13

	A	B	C	E	F
status	x	x	x	x	x
link	D	D	D	D	D
cost	25	∞	10	∞	9

round 1 Pick F

update A: AF (∞) < ? cost A — No

update B: FB (∞) < ? cost B — No

update C: FC (3) < ? cost C (10) — Yes — Link C = F, cost C = 3

update E: FE (6) < ? cost E (∞) — Yes — Link E = F, cost E = 6

	A	B	C	E	F
status	x	x	x	x	v
link	D	D	F	F	D
cost	25	∞	3	6	9

round 2 Pick C and update

Update A: AC (∞) < ? cost B — No

Update B: BC (5) < ? cost B (∞) — Yes — link B = C, cost B = 5

Update E: EC (2) < ? cost E (6) — Yes — link E = C, cost E = 2

	A	B	C	E	F
status	x	x	v	x	v
link	D	C	F	C	D
cost	25	5	3	2	9

round 3 Pick E and update

	A	B	C	E	F
status	x	x	v	v	v
link	D	E	F	C	D
cost	25	4	3	2	9

round 4 pick B and update

	A	B	C	E	F
status	x	v	v	v	v
link	B	E	F	C	D
cost	24	4	3	2	9

round 5 Pick A and we're finished.
Minimal spanning tree has edges AB, BE, CF, EC, FD.

Its total weight is
24 + 4 + 3 + 2 + 9 = 42.