

1.

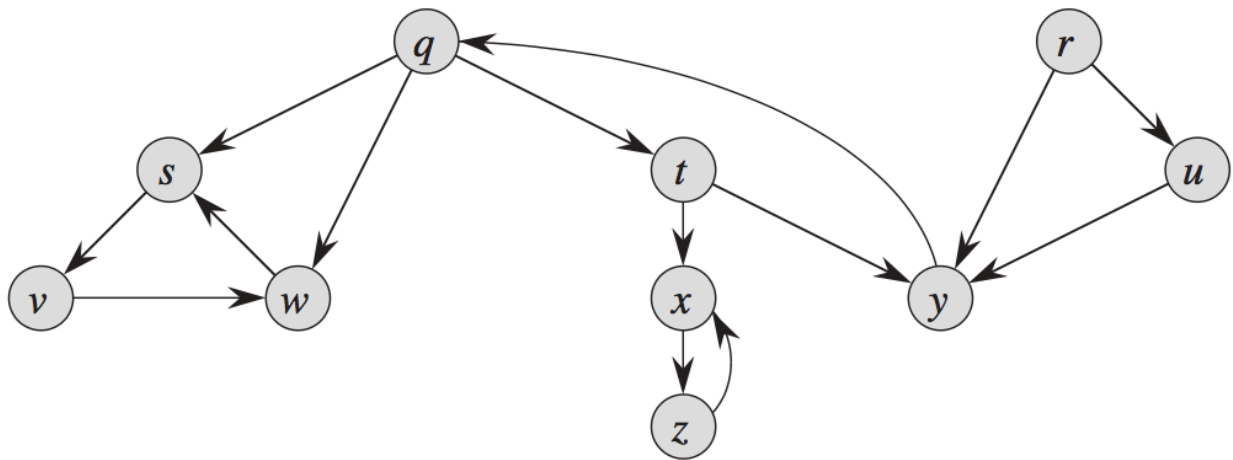
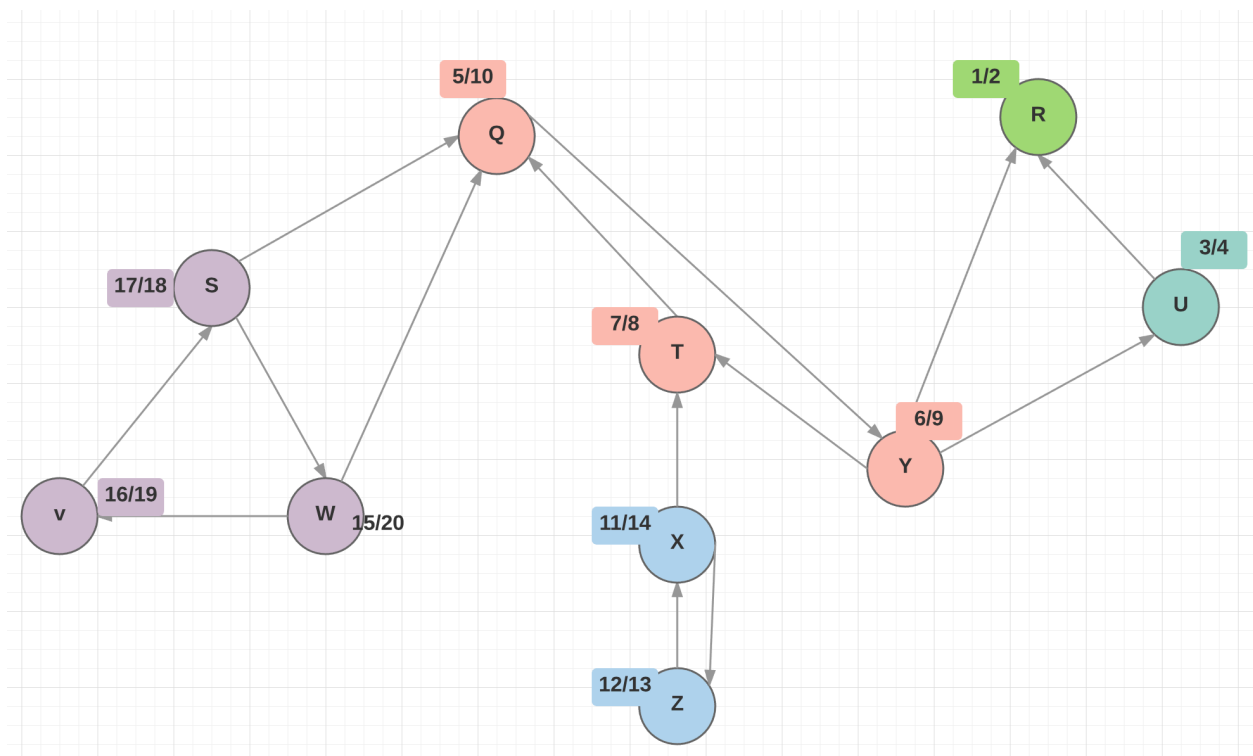
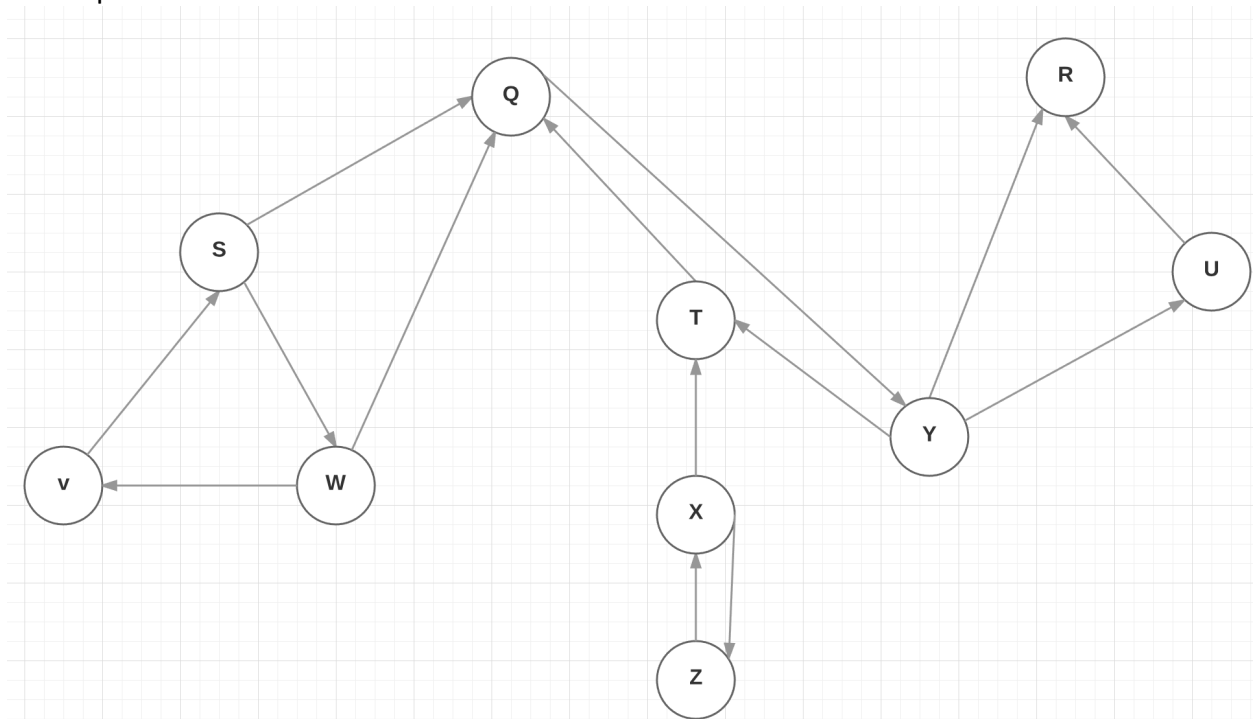


Figure 22.6 A directed graph for use in Exercises 22.3-2 and 22.5-2.

Finished time:

Q	R	S	T	U	V	W	X	Y	Z
16	20	6	15	18	5	7	12	14	11

Forest produced in line 3:



2.

Floyd-Warshall-Plus(G, W)

n = G.rows

For l = 1 to n

For j = 1 to n

$d_{ij} = w_{ij}$

$b_{ij} = Nil$

if $d_{ij} \neq \infty$

$N_{ij} = 1$

for k = 1 to n

for l = 1 to n

for j = 1 to n

if $d_{ij} > d_{kj} + d_{kj}$

$d_{ij} > d_{kj} + d_{kj}$

$b_{ij} = k$

$N_{ij} = N_{ik} * N_{kj}$

else if $d_{ij} == d_{kj} + d_{kj}$

$N_{ij} = N_{ij} + N_{ik} * N_{kj}$

return N_{ij}

Time: because if and else if statement in nested for loop take constant time,

The three nested for loop dominate the time, which is $O(n^3)$

Space: we initial three matrices, for each matrix is n by n.

So the space should be $O(n^2)$