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Dynamic Programming
(1969) 1984

"An optimal policy has the property that whatever the initial state and initial decision are, the remaining decisions must constitute an optimal policy with regard to the state resulting from first decision".

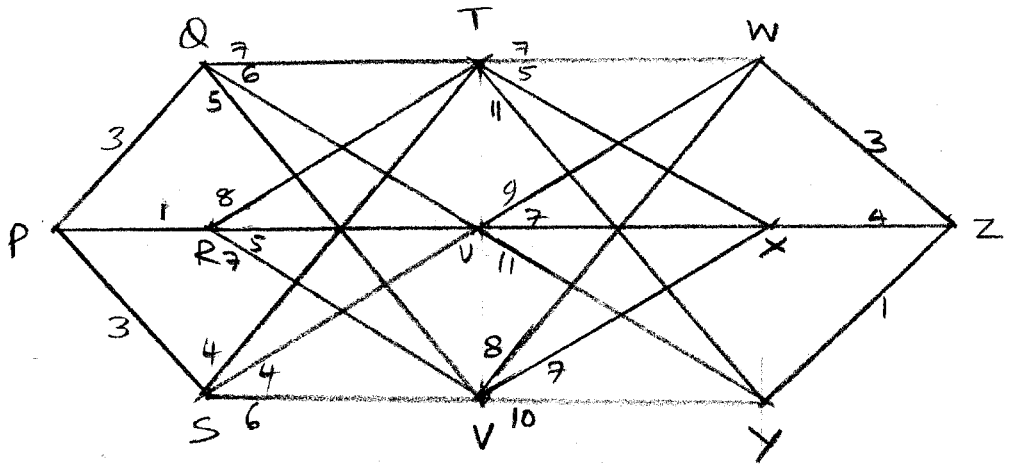
R. E. Bellman

Dynamic Programming
When an objective can be attained through different alternatives at different stages, an optimal solution / method can be found through.

Dynamic Programming
The technique is called "Dynamic" because it suggests different alternatives at different stages if a stage is completed i.e. irrespective of previous decisions an optimal solution is suggested in "Present" situation.

DYNAMIC PROGRAMMING

A PROBLEM



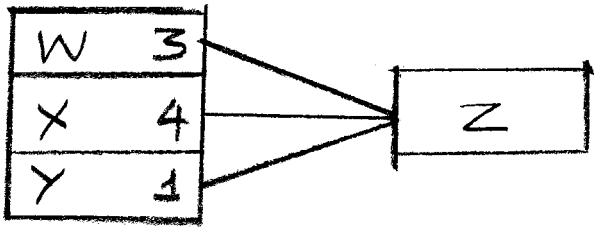
To find out the shortest route
From P to Z and
Also from all points to Z

Q1, R1, S1, T1, U1, V1 Are intermediate alternative consideration situations.

These indicate what will happen if alternative route are taken.

All dynamic programming situations can be evaluated by this method.

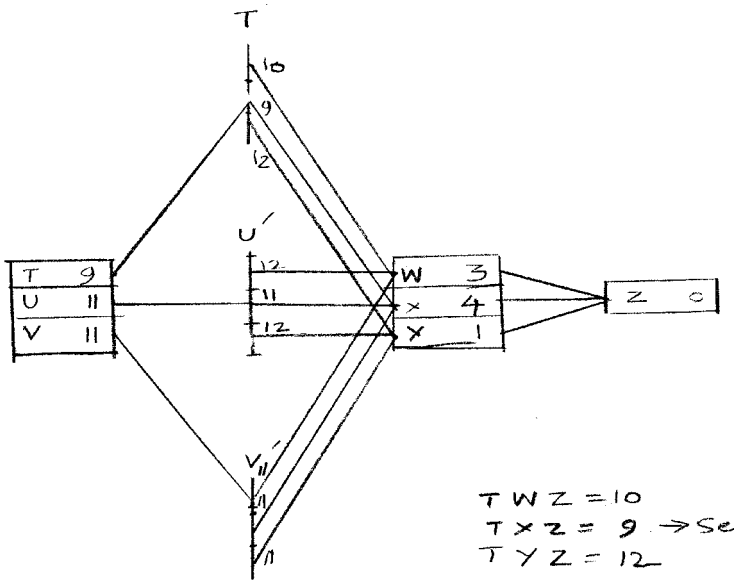
START FROM Z (END)



From Z there are three routes towards P

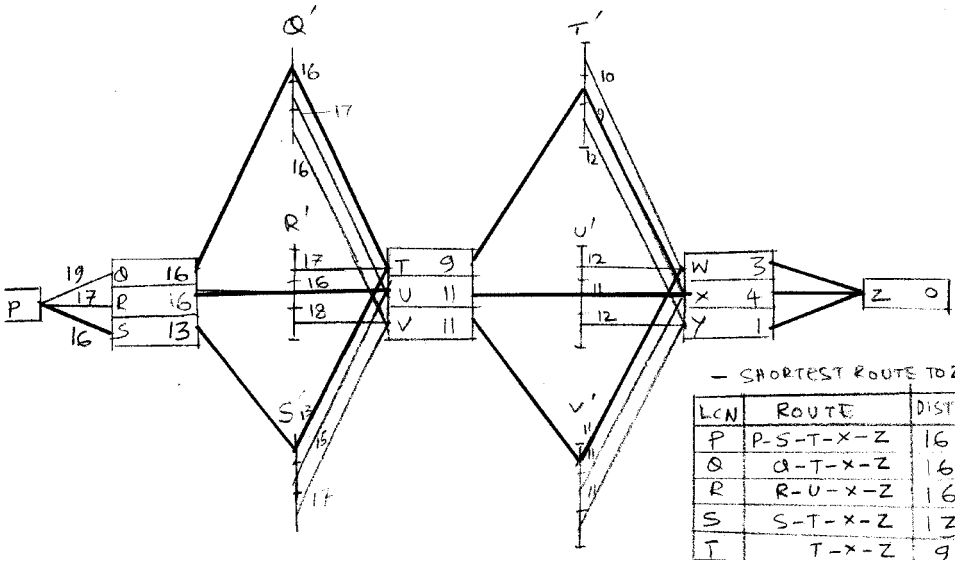
Z – W
Z – X
Z – Y

Represent as shown consider alternates for W,X,Y separately as shown.



VWZ = 11
VXZ = 11 select any
VYZ = 11 say VXZ

TWZ = 10
TXZ = 9 select TXZ
TYZ = 12
UWZ = 12
UXZ = 11 select UXZ
UYZ = 12
And continue till P



Shortest Route to Z

LCN	Route	Distance
P	P – S – T – X – Z	16
Q	Q – T – X – Z	16
R	R – U – X – Z	16
S	S – T – X – Z	13
T	T – X – Z	9
U	U – X – Z	11
V	V – W – Z	11
W	W – Z	3
X	X – Y	4
Y	Y – Z	1