Practice 4.1: Scheduling
Combinatorial Optimization

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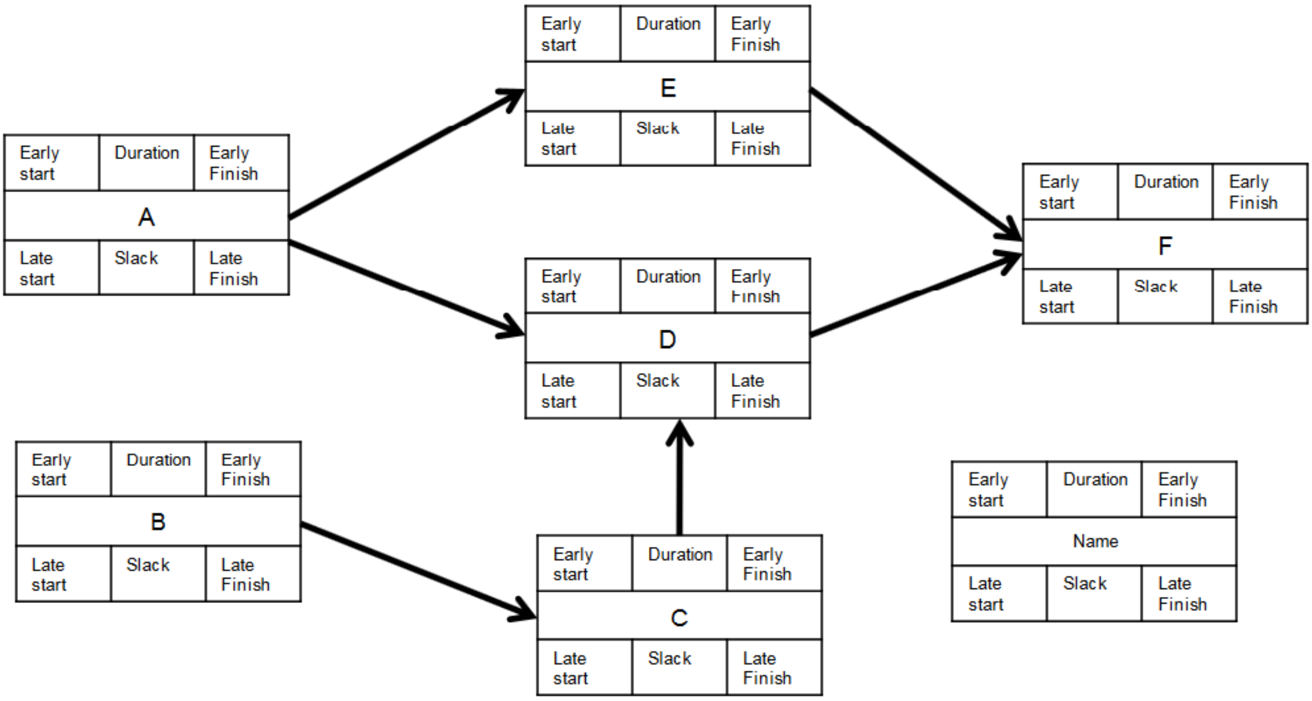
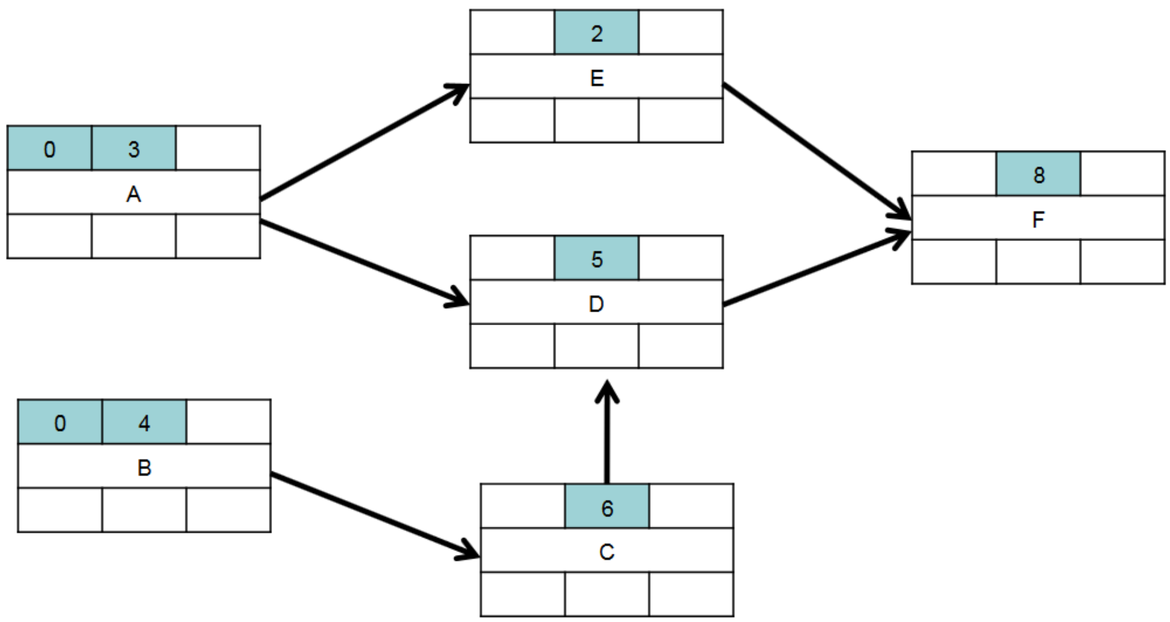
AON

We want to organize a conference. The activities list is as follows:

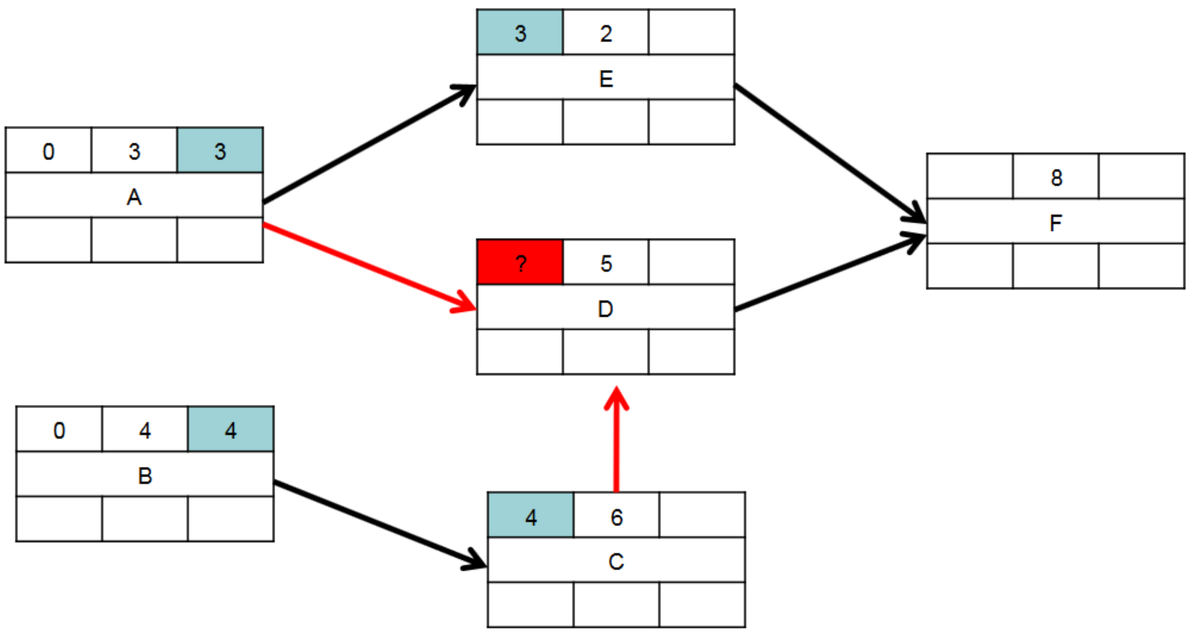
A. Prepare budget (no predecessor), 5d
B. Contact speakers (A), 6d
C. Contact locations (A), 9d
D. Select location (C), 9d
E. Finalize schedule (B), 3d
F. Send brochures (B), 20d

First step: activity durations and early start of initial activities



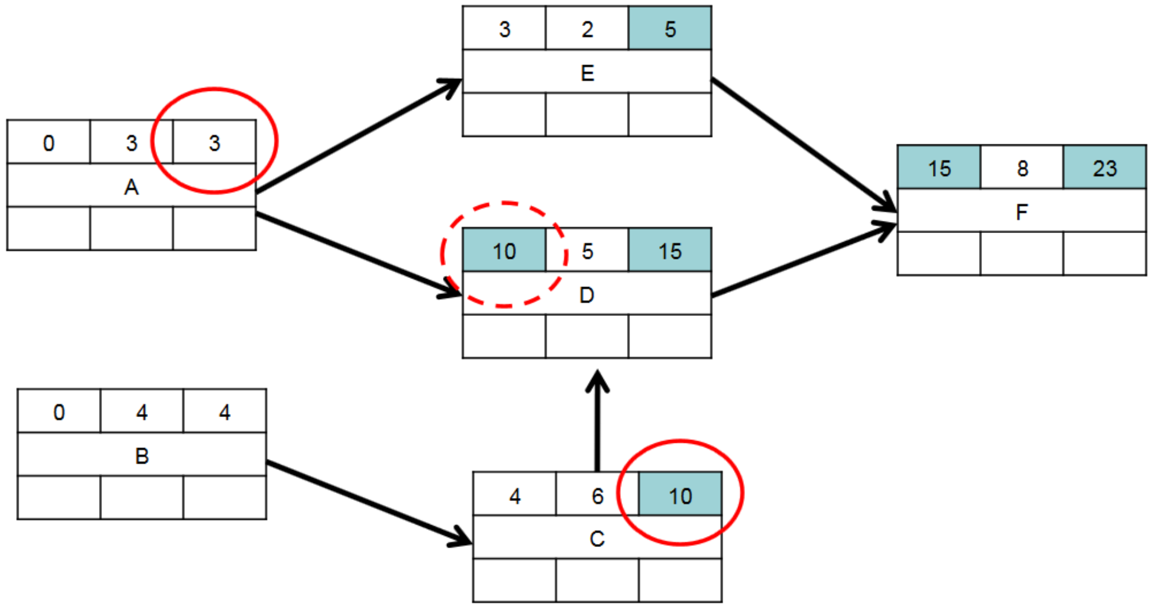


Step 2: computing early start and early finish

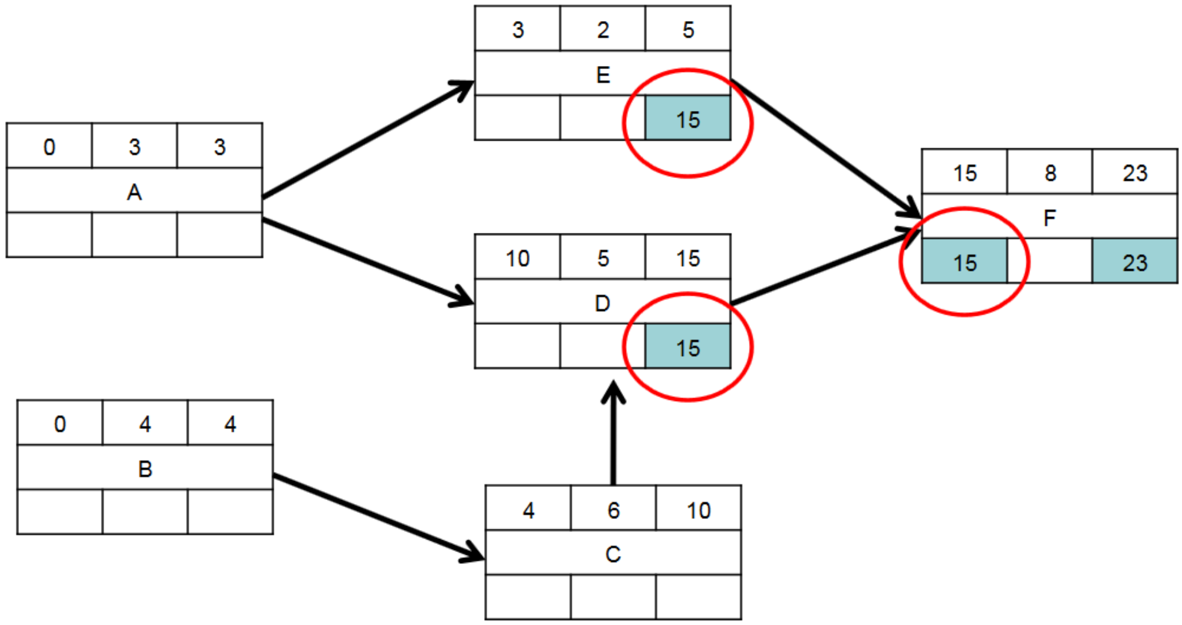


- EF(A)=ES(A)+3=3
- EF(B)=ES(B)+4=4
- ES(C)=max(EF(B))=4
- EF(C)=ES(C)+6=10
- ES(E)=max(EF(A))=3
- EF(E)=ES(E)+2=5
- ES(D)=max(EF(A); EF(C))=10
- EF(D)=ES(D)+5=15
- ES(F)=max(EF(D) ; EF(E))=15

- EF(F)=ES(F)+8=23

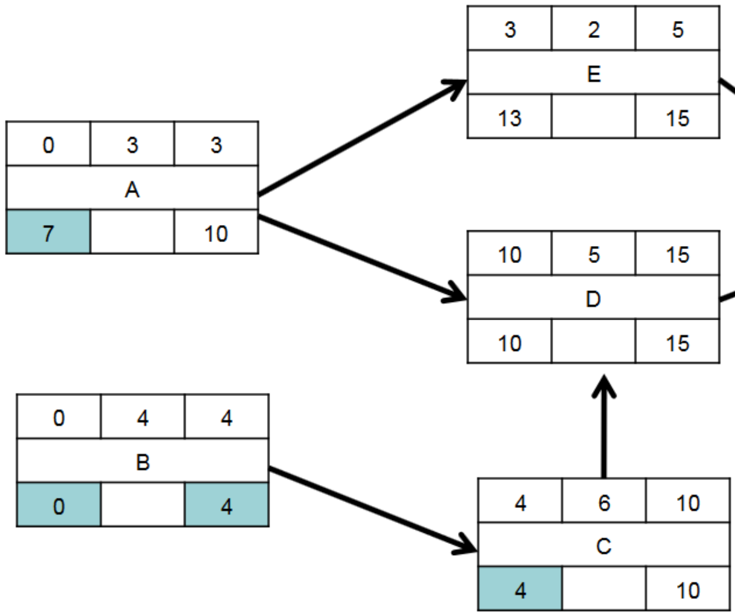


Step 3: computing backward pass for late start and late finish



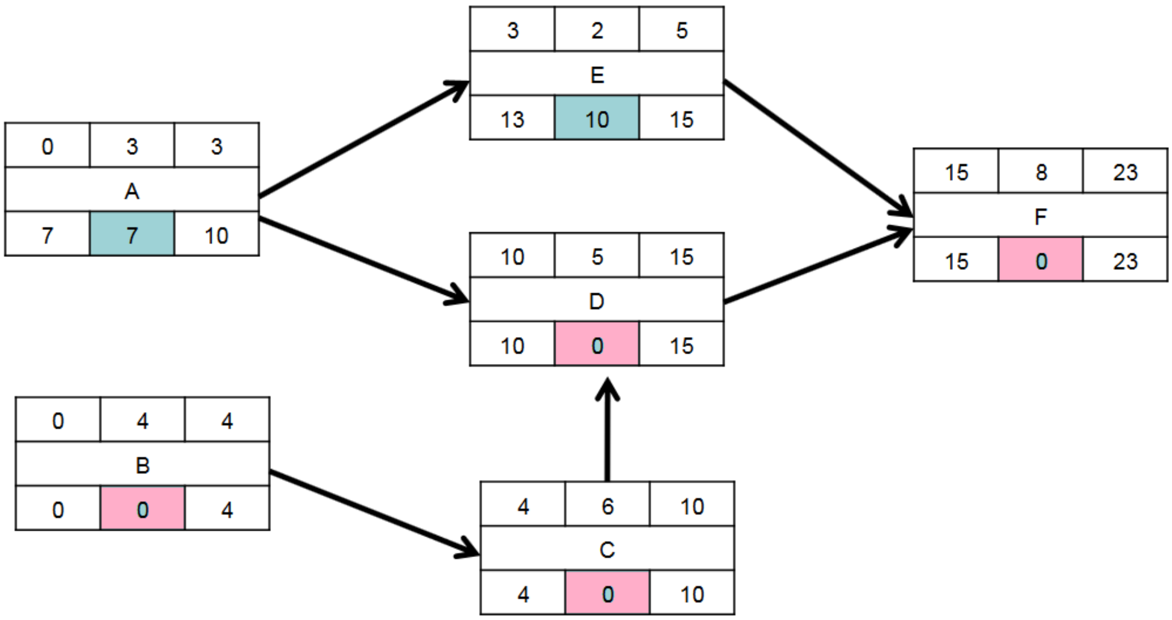
- LS(F)=ES(F)=15
- LF(F)=EF(F)=23
- LF(E)=min(LS(F))=15
- LF(D)=min(LS(F))=15
- LS(E)=LF(E)-2=13
- LS(D)=LF(D)-5=10
- LF(C)=min(LS(D))=10
- LS(C)=LF(C)-6=4
- LF(B)=min(LS(C))=4

- LS(B)=LF(B)-4=0
- LF(A)=min(LS(D), LS(E))=10
- LS(A)=LF(A)-3=7



Step 4 : computing slacks

Total slack=LF-EF=LS-ES



Critical path: a path where slacks are equal to zero

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Safety slack: LS(i) - $\max_{\text{all predecessors } j}$(LF(j)) the allowable delay of an activity I when all predecessors finish as late as possible.

Free slack: $\min_{\text{all successors } j}(ES(j)) - EF(i)$ the allowable delay of an activity that has no effect on the earliest start ES of a successor activity.

	Total slack	Safety slack	Free slack
A	7	0	0
B	0	0	0
C	0	0	0
D	0	0	0
E	10	3	10
F	0	0	0