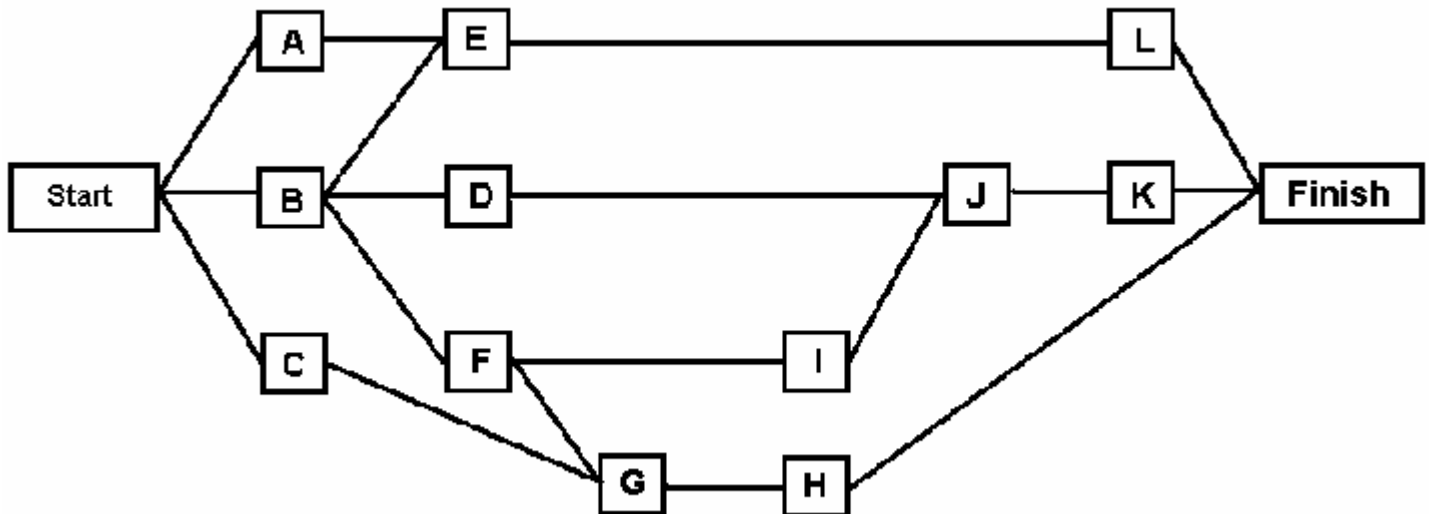


PERT/CPM Network Problem with Time vs. Cost – Prof. Richard B. Goldstein



| Activity | Immediate Predecessor | Expected Time | ES | EF | LS | LF | Slack |
|----------|-----------------------|---------------|----|----|----|----|-------|
| A        | -                     | 2             | 0  | 2  | 3  | 5  | 3     |
| B        | -                     | 3             | 0  | 3  | 0  | 3  | 0*    |
| C        | -                     | 2             | 0  | 2  | 3  | 5  | 3     |
| D        | B                     | 4             | 3  | 7  | 7  | 11 | 4     |
| E        | A, B                  | 3             | 3  | 6  | 5  | 8  | 2     |
| F        | B                     | 2             | 3  | 5  | 3  | 5  | 0*    |
| G        | C, F                  | 5             | 5  | 10 | 5  | 10 | 0*    |
| H        | G                     | 4             | 10 | 14 | 10 | 14 | 0*    |
| I        | F                     | 3             | 5  | 8  | 8  | 11 | 3     |
| J        | D, I                  | 2             | 8  | 10 | 11 | 13 | 3     |
| K        | J                     | 1             | 10 | 11 | 13 | 14 | 3     |
| L        | E                     | 6             | 6  | 12 | 8  | 14 | 2     |

Simulation result with  $N(\mu, 1)$  for each activity:

| Path      | Expected Time | % of time path is critical path |
|-----------|---------------|---------------------------------|
| A-E-L     | 11            | 6.0%                            |
| B-E-L     | 12            | 12.9%                           |
| B-D-J-K   | 10            | 1.7%                            |
| B-F-I-J-K | 11            | 5.4%                            |
| B-F-G-H   | 14            | 71.2%                           |
| C-G-H     | 11            | 2.8%                            |

Critical Path: Mean = 14.442  
St. Dev. = 1.677

| Activity | Regular Cost | Regular Time | Crash Cost | Crash Time | Extra Cost/Day | Changes   |
|----------|--------------|--------------|------------|------------|----------------|-----------|
| A        | \$300        | 2            | 300        | 2          | -              | #2 #3 #4  |
| B        | 400          | 3            | 400        | 3          | -              |           |
| C        | 700          | 2            | 700        | 2          | -              |           |
| D        | 400          | 4            | 450        | 3          | \$50 / day     |           |
| E        | 600          | 3            | 600        | 3          | -              |           |
| F        | 500          | 2            | 600        | 1          | \$100 / day    | (-1)      |
| G        | 500          | 5            | 900        | 3          | \$200 / day    | (-1) (-1) |
| H        | 300          | 4            | 300        | 4          | -              |           |
| I        | 100          | 3            | 100        | 3          | -              |           |
| J        | 400          | 2            | 400        | 2          | -              |           |
| K        | 300          | 1            | 300        | 1          | -              |           |
| L        | 500          | 6            | 725        | 3          | \$75 / day     | (-1)      |
| Total    | \$5000       |              |            |            |                |           |

| Path      | Plan #1 | Plan #2 | Plan #3 | Plan #4 |
|-----------|---------|---------|---------|---------|
| A-E-L     | 11      | 11      | 11      | 10      |
| B-E-L     | 12      | 12      | 12 *    | 11 *    |
| B-D-J-K   | 10      | 10      | 10      | 10      |
| B-F-I-J-K | 11      | 10      | 10      | 10      |
| B-F-G-H   | 14 *    | 13 *    | 12 *    | 11 *    |
| C-G-H     | 11      | 11      | 10      | 9       |

| Plan | Critical Time | Change           | Extra Cost      | Total Cost | Critical Path(s) |
|------|---------------|------------------|-----------------|------------|------------------|
| #1   | 14            |                  |                 | \$5,000    | B-F-G-H          |
| #2   | 13            | F by 1           | +\$100          | \$5,100    | B-F-G-H          |
| #3   | 12            | G by 1           | +\$200          | \$5,300    | B-F-G-H, B-E-L   |
| #4   | 11            | G by 1<br>L by 1 | +\$200<br>+\$75 | \$5,575    | B-F-G-H, B-E-L   |

