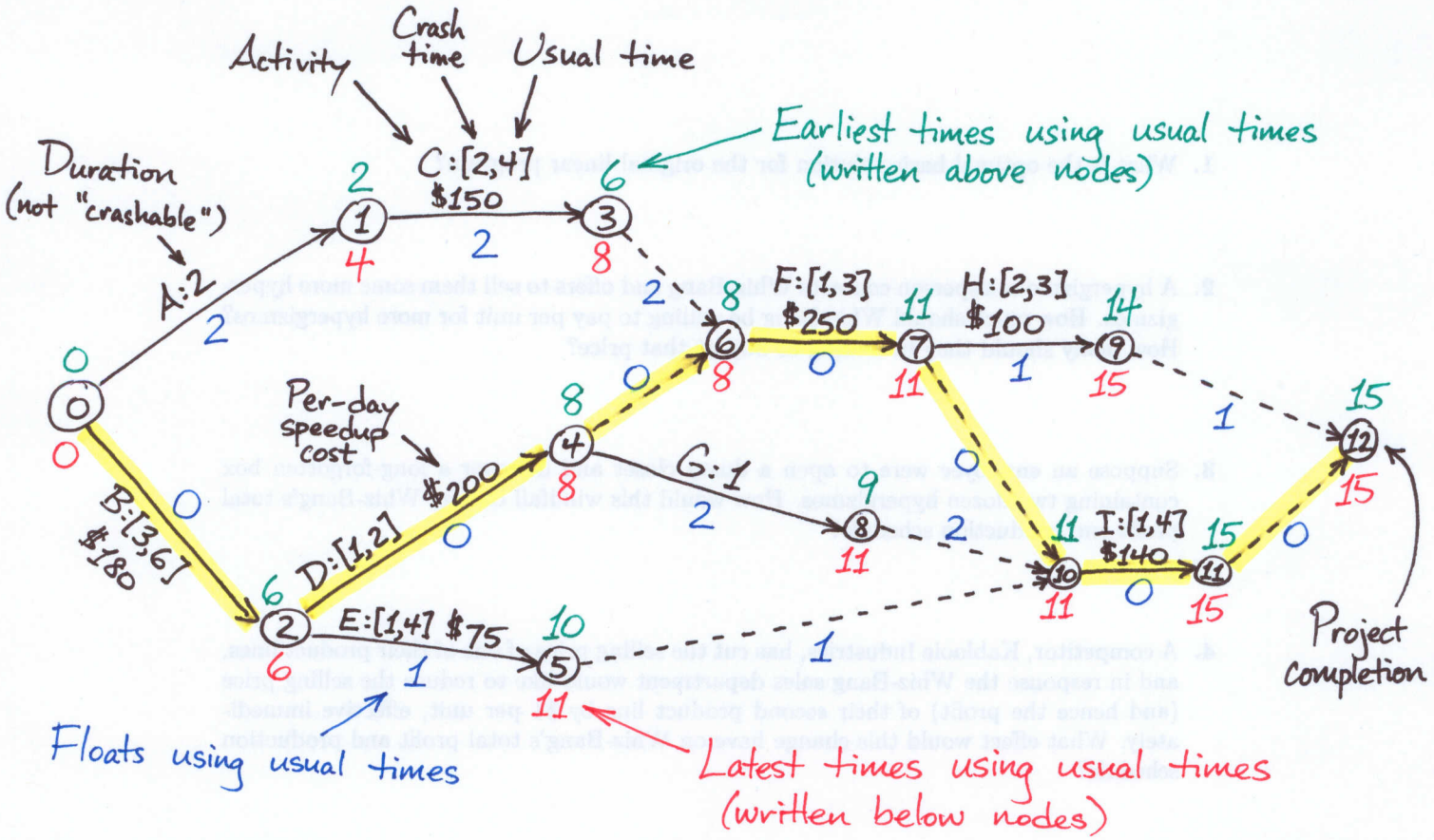

Critical path: B–D–F–I.

[Note: There are many correct ways to draw a CPM network for this project.]

LP to determine the least expensive way to reduce the length of the project by 4 days: (Optimal objective value is \$740.)

$$\min \quad 180(6-t_B) + 150(4-t_C) + 200(2-t_D) + 75(4-t_E) + 250(3-t_F) + 100(3-t_H) + 140(4-t_I)$$

Total speedup cost

s.t.

Network constraints

Sequence constraints

$t_1 - t_0 \geq 2$
$t_2 - t_0 \geq t_B$
$t_3 - t_1 \geq t_C$
$t_4 - t_2 \geq t_D$
$t_5 - t_2 \geq t_E$
$t_7 - t_6 \geq t_F$
$t_8 - t_4 \geq 1$
$t_9 - t_7 \geq t_H$
$t_{11} - t_{10} \geq t_I$

Dummy constraints

$t_6 - t_3 \geq 0$
$t_6 - t_4 \geq 0$
$t_{10} - t_7 \geq 0$
$t_{10} - t_8 \geq 0$
$t_{10} - t_5 \geq 0$
$t_{12} - t_9 \geq 0$
$t_{12} - t_{11} \geq 0$

Duration constraints

$3 \leq t_B \leq 6$
$2 \leq t_C \leq 4$
$1 \leq t_D \leq 2$
$1 \leq t_E \leq 4$
$1 \leq t_F \leq 3$
$2 \leq t_H \leq 3$
$1 \leq t_I \leq 4$

Deadline: $t_{12} \leq 11$ ← Project completion time

All variables ≥ 0.

LP to determine the shortest possible completion time that can be achieved with a budget of \$900: (Optimal objective value is 10.36 days.)

$$\min \quad t_{12}$$

s.t. [All network constraints]

[Total speedup cost] ≤ 900

All variables ≥ 0.