Lubbock Florist Project - Class Practice 5

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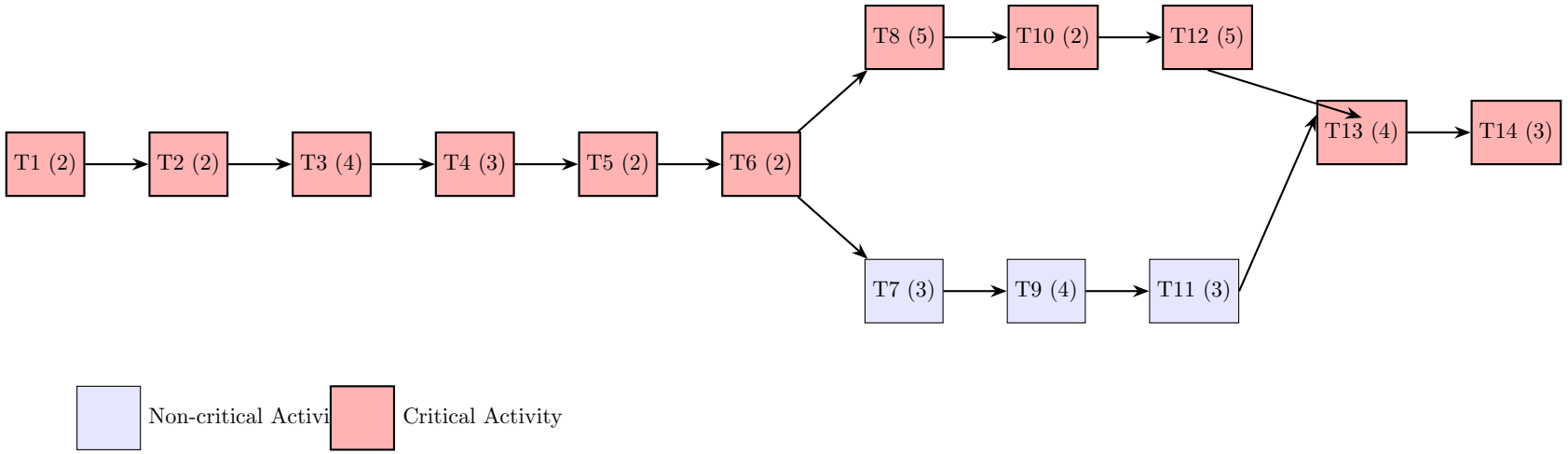
Problem 1: Activity on Network (AON) Diagram



Problem 2: Critical Path Analysis

Critical Path Identification

Critical Path: T1 → T2 → T3 → T4 → T5 → T6 → T8 → T10 → T12 → T13 → T14

Total Project Duration: 34 days

Activity Timing Analysis

Activity	Duration	ES	EF	LS	LF	Slack	Critical?
T1	2	0	2	0	2	0	Yes
T2	2	2	4	2	4	0	Yes
T3	4	4	8	4	8	0	Yes
T4	3	8	11	8	11	0	Yes
T5	2	11	13	11	13	0	Yes
T6	2	13	15	13	15	0	Yes
T7	3	15	18	17	20	2	No
T8	5	15	20	15	20	0	Yes
T9	4	18	22	20	24	2	No
T10	2	20	22	20	22	0	Yes
T11	3	22	25	24	27	2	No
T12	5	22	27	22	27	0	Yes
T13	4	27	31	27	31	0	Yes
T14	3	31	34	31	34	0	Yes

Problem 3: Project Duration Reduction

Proposed Changes to Reduce Project Duration by 4 Days

Change 1: Parallelize T2 and T3

- **Current:** T3 starts after T2
- **Proposed:** T3 starts after T1, parallel with T2
- **Justification:** Component discovery can begin with core requirements; doesn't require complete use case model
- **Time saved:** 2 days

Change 2: Parallelize T4 and T5

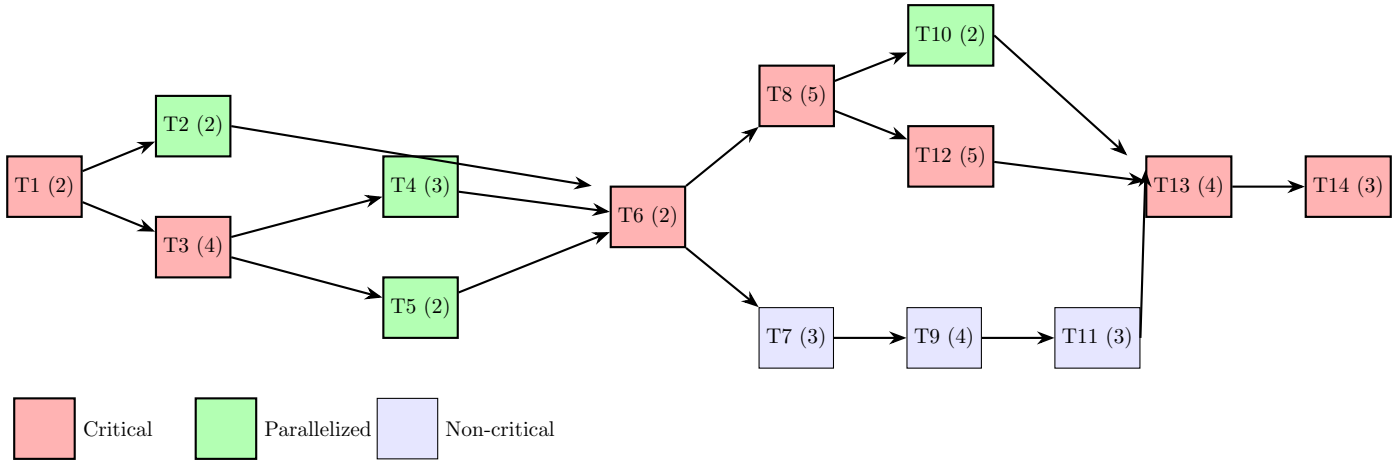
- **Current:** T5 starts after T4
- **Proposed:** T5 runs parallel with T4
- **Justification:** Security assessment can be done independently of functional evaluation
- **Time saved:** 2 days

Change 3: Parallelize T10 and T12

- **Current:** T12 starts after T10
- **Proposed:** T12 starts after T8, parallel with T10
- **Justification:** Custom ordering development can proceed independently of module configuration
- **Time saved:** 2 days effective

Total reduction: 4 days (New duration: 30 days)

Problem 4: Shortened AON Network



New Critical Path: T1 → T3 → T4 → T6 → T8 → T12 → T13 → T14 **(30 days)**

Problem 5: PERT Analysis

PERT Calculations

Expected duration: $TE = \frac{O+4M+P}{6}$ Variance: $\sigma^2 = \left(\frac{P-O}{6}\right)^2$

Activity	O	M	P	TE	σ^2	σ
T1	1	2	3	2.00	0.111	0.333
T2	1	2	3	2.00	0.111	0.333
T3	3	4	6	4.17	0.250	0.500
T4	2	3	5	3.17	0.250	0.500
T5	1	2	5	2.33	0.444	0.667
T6	1	2	5	2.33	0.444	0.667
T7	2	3	5	3.17	0.250	0.500
T8	2	5	5	4.50	0.250	0.500
T9	3	4	6	4.17	0.250	0.500
T10	1	2	4	2.17	0.250	0.500
T11	1	3	5	3.00	0.444	0.667
T12	1	5	6	4.50	0.694	0.833
T13	3	4	8	4.50	0.694	0.833
T14	2	3	4	3.00	0.111	0.333

PERT Critical Path Analysis

Using PERT expected durations, the critical path remains: **T1 → T2 → T3 → T4 → T5 → T6 → T8 → T10 → T12 → T13 → T14**

Expected Project Duration: 33.34 days
Critical Path Variance: $\sigma_{cp}^2 = 0.111 + 0.111 + 0.250 + 0.250 + 0.444 + 0.444 + 0.250 + 0.250 + 0.694 + 0.694 + 0.111 = 3.609$
Standard Deviation: $\sigma_{cp} = 1.90$ days
Probability Analysis:

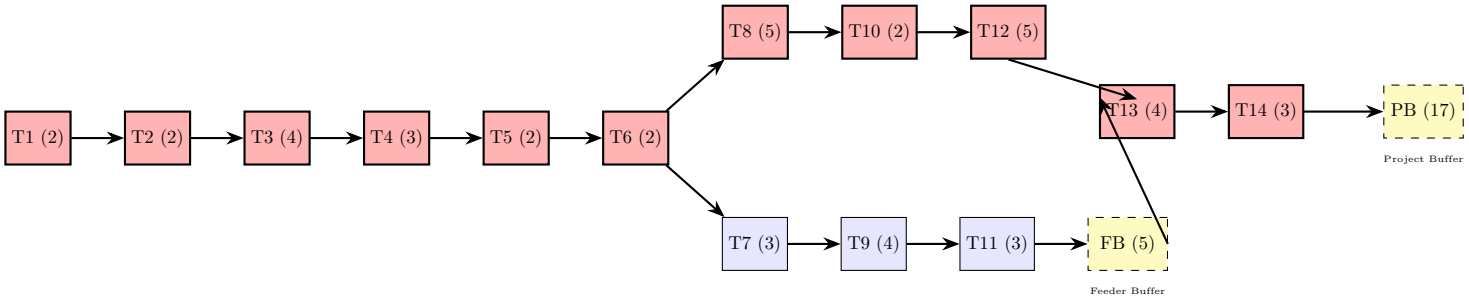
- 68% probability: Project completes between 31.44 and 35.24 days
- 95% probability: Project completes between 29.54 and 37.14 days
- 99.7% probability: Project completes between 27.64 and 39.04 days

Problem 6: Critical Chain Schedule

Critical Chain Buffer Calculations

Based on the original critical path (34 days):

- **Project Buffer:** 50% of critical chain = 17 days
- **Feeder Buffer 1:** T7→T9→T11 chain (10 days) → 5-day buffer
- **Total Project Duration with Buffers:** 51 days



Critical Chain Management Guidelines

1. **Project Buffer (17 days):** Protects overall project completion
2. **Feeder Buffer (5 days):** Protects critical chain from delays in T7-T9-T11 path
3. **Buffer Management:**
   - Green zone (0-33% buffer consumed): No action needed
   - Yellow zone (33-67% buffer consumed): Monitor closely, prepare recovery plans
   - Red zone (67-100% buffer consumed): Implement recovery actions
4. **Focus:** Prioritize critical chain activities; ensure resources are available when needed

Summary

- **Original Duration:** 34 days (deterministic)
- **PERT Expected Duration:** 33.34 days ($\pm$ 1.90 days)
- **Shortened Duration:** 30 days (with parallelization)
- **Critical Chain Duration:** 51 days (with buffers)