

Scheduling Report

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1 Introduction

Table 1: Problem

| Name | Timepoints as Date | Nr Products | Nr Process | Nr Disjunctive Resources | Nr Cumulative Resources | Nr Orders | Nr Jobs | Nr Tasks |
|------|--------------------------|----------------|---------------|--------------------------------|-------------------------------|--------------|------------|-------------|
| P1 | true | 5 | 5 | 8 | 1 | 50 | 50 | 200 |

2 Orders

Table 2: Orders (Total 50)

| Name | Product | Process | Qty | Release | Due | Earliness | Weight | Lateness | Weight |
|--------|---------|-----------|-----|---------|-------|-----------|--------|----------|--------|
| Order0 | Prod4 | Process 4 | 4 | 0 | 928 | | 1.00 | | 1.00 |
| Order1 | Prod4 | Process 4 | 1 | 0 | 2,546 | | 1.00 | | 1.00 |
| Order2 | Prod3 | Process 3 | 1 | 0 | 2,809 | | 1.00 | | 1.00 |
| Order3 | Prod3 | Process 3 | 4 | 0 | 506 | | 1.00 | | 1.00 |
| Order4 | Prod1 | Process 1 | 5 | 0 | 800 | | 1.00 | | 1.00 |
| Order5 | Prod0 | Process 0 | 7 | 0 | 159 | | 1.00 | | 1.00 |
| Order6 | Prod3 | Process 3 | 5 | 0 | 2,759 | | 1.00 | | 1.00 |
| Order7 | Prod1 | Process 1 | 5 | 0 | 1,852 | | 1.00 | | 1.00 |

| Name | Product | Process | Qty | Release | Due | Earliness | Weight | Lateness | Weight |
|---------|---------|-----------|-----|---------|-------|-----------|--------|----------|--------|
| Order8 | Prod1 | Process 1 | 2 | 0 | 287 | | 1.00 | | 1.00 |
| Order9 | Prod1 | Process 1 | 4 | 0 | 80 | | 1.00 | | 1.00 |
| Order10 | Prod1 | Process 1 | 8 | 0 | 1,696 | | 1.00 | | 1.00 |
| Order11 | Prod4 | Process 4 | 4 | 0 | 1,838 | | 1.00 | | 1.00 |
| Order12 | Prod3 | Process 3 | 5 | 0 | 2,542 | | 1.00 | | 1.00 |
| Order13 | Prod2 | Process 2 | 5 | 0 | 1,013 | | 1.00 | | 1.00 |
| Order14 | Prod3 | Process 3 | 2 | 0 | 1,602 | | 1.00 | | 1.00 |
| Order15 | Prod2 | Process 2 | 5 | 0 | 2,862 | | 1.00 | | 1.00 |
| Order16 | Prod2 | Process 2 | 6 | 0 | 335 | | 1.00 | | 1.00 |
| Order17 | Prod2 | Process 2 | 9 | 0 | 2,403 | | 1.00 | | 1.00 |
| Order18 | Prod3 | Process 3 | 6 | 0 | 2,691 | | 1.00 | | 1.00 |
| Order19 | Prod3 | Process 3 | 9 | 0 | 2,773 | | 1.00 | | 1.00 |
| Order20 | Prod3 | Process 3 | 9 | 0 | 657 | | 1.00 | | 1.00 |
| Order21 | Prod1 | Process 1 | 5 | 0 | 2,725 | | 1.00 | | 1.00 |
| Order22 | Prod1 | Process 1 | 4 | 0 | 1,851 | | 1.00 | | 1.00 |
| Order23 | Prod4 | Process 4 | 6 | 0 | 2,641 | | 1.00 | | 1.00 |
| Order24 | Prod2 | Process 2 | 4 | 0 | 1,854 | | 1.00 | | 1.00 |
| Order25 | Prod1 | Process 1 | 3 | 0 | 100 | | 1.00 | | 1.00 |
| Order26 | Prod0 | Process 0 | 7 | 0 | 2,440 | | 1.00 | | 1.00 |
| Order27 | Prod4 | Process 4 | 3 | 0 | 1,701 | | 1.00 | | 1.00 |
| Order28 | Prod4 | Process 4 | 9 | 0 | 311 | | 1.00 | | 1.00 |
| Order29 | Prod3 | Process 3 | 5 | 0 | 251 | | 1.00 | | 1.00 |
| Order30 | Prod2 | Process 2 | 4 | 0 | 2,739 | | 1.00 | | 1.00 |
| Order31 | Prod2 | Process 2 | 3 | 0 | 2,439 | | 1.00 | | 1.00 |
| Order32 | Prod0 | Process 0 | 8 | 0 | 104 | | 1.00 | | 1.00 |
| Order33 | Prod0 | Process 0 | 1 | 0 | 1,955 | | 1.00 | | 1.00 |
| Order34 | Prod2 | Process 2 | 7 | 0 | 2,488 | | 1.00 | | 1.00 |
| Order35 | Prod3 | Process 3 | 3 | 0 | 348 | | 1.00 | | 1.00 |
| Order36 | Prod1 | Process 1 | 3 | 0 | 2,719 | | 1.00 | | 1.00 |
| Order37 | Prod3 | Process 3 | 8 | 0 | 1,664 | | 1.00 | | 1.00 |
| Order38 | Prod4 | Process 4 | 9 | 0 | 2,348 | | 1.00 | | 1.00 |
| Order39 | Prod3 | Process 3 | 3 | 0 | 1,947 | | 1.00 | | 1.00 |
| Order40 | Prod2 | Process 2 | 8 | 0 | 2,304 | | 1.00 | | 1.00 |
| Order41 | Prod0 | Process 0 | 4 | 0 | 2,703 | | 1.00 | | 1.00 |
| Order42 | Prod3 | Process 3 | 5 | 0 | 384 | | 1.00 | | 1.00 |
| Order43 | Prod0 | Process 0 | 3 | 0 | 2,821 | | 1.00 | | 1.00 |

| Name | Product | Process | Qty | Release | Due | Earliness | Weight | Lateness | Weight |
|---------|---------|-----------|-----|---------|-------|-----------|--------|----------|--------|
| Order44 | Prod3 | Process 3 | 5 | 0 | 1,885 | | 1.00 | | 1.00 |
| Order45 | Prod1 | Process 1 | 8 | 0 | 1,333 | | 1.00 | | 1.00 |
| Order46 | Prod3 | Process 3 | 9 | 0 | 1,386 | | 1.00 | | 1.00 |
| Order47 | Prod3 | Process 3 | 2 | 0 | 837 | | 1.00 | | 1.00 |
| Order48 | Prod0 | Process 0 | 5 | 0 | 2,088 | | 1.00 | | 1.00 |
| Order49 | Prod2 | Process 2 | 1 | 0 | 2,669 | | 1.00 | | 1.00 |

3 Solution

Table 3: Relaxation of Constraints

| Name | Label | Enforce Release Date | Enforce Due Date | Enforce Cumulative | Enforce WiP | Enforce Downtime | Nr Threads | Timeout (s) |
|------|-------|----------------------|------------------|--------------------|-------------|------------------|------------|-------------|
| Sol1 | test | true | false | false | true | true | 2 | 60 |
| Sol2 | test | true | false | true | true | true | 2 | 60 |
| Sol3 | test | true | false | false | true | true | 2 | 60 |

Table 4: Solutions (Total 3)

| Name | Solver Status | Objective Type | Objective Value | Bound | Gap | Makespan | Flowtime | Total Lateness | Max Lateness | Nr Late | Total Earliness | Max Earliness | Nr Early | Model Type | Time (s) |
|------|---------------|----------------|-----------------|---------|------|----------|----------|----------------|--------------|---------|-----------------|---------------|----------|------------|----------|
| Sol1 | Solution | TotalLateness | 2,491 | 1079.00 | 0.57 | 2,495 | 67,626 | 2,491 | 657 | 10 | 19,038 | 1,346 | 40 | CPO | 60.24 |
| Sol2 | Solution | Makespan | 2,643 | 1732.00 | 0.34 | 2,643 | 72,509 | 19,900 | 2,270 | 23 | 31,564 | 2,611 | 27 | CPO | 60.09 |
| Sol3 | Solution | Makespan | 2,170 | 710.00 | 0.67 | 2,170 | 70,931 | 15,710 | 1,913 | 19 | 28,952 | 2,489 | 31 | CPO | 60.07 |

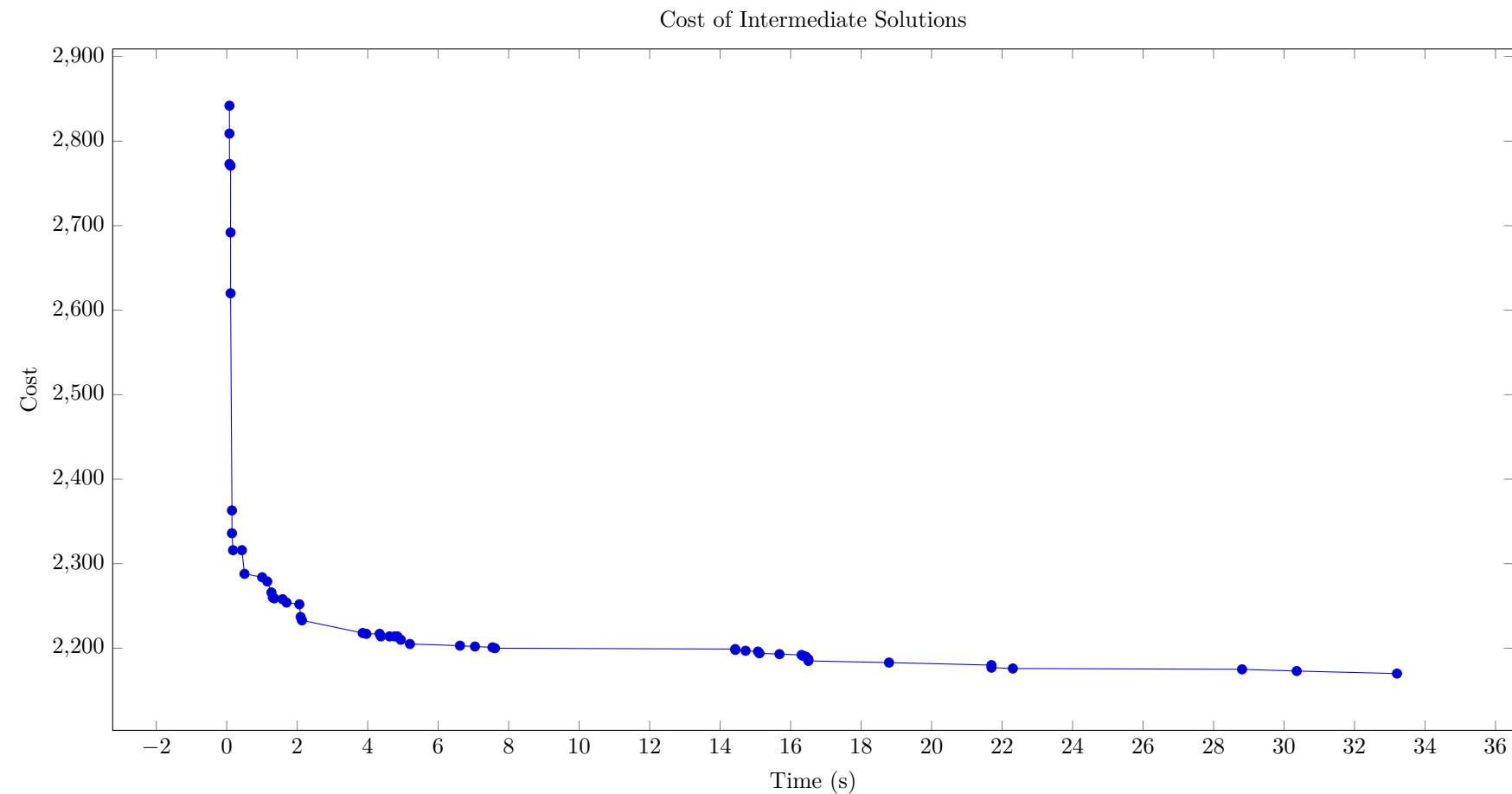
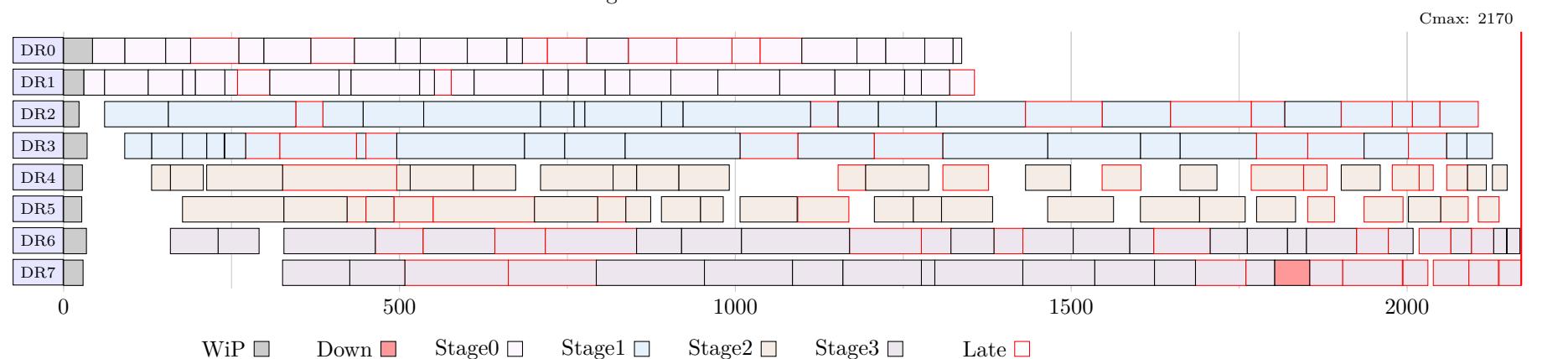


Figure 1: Machine Gantt for Solution Sol3



Resource Utilization for Solution Sol3

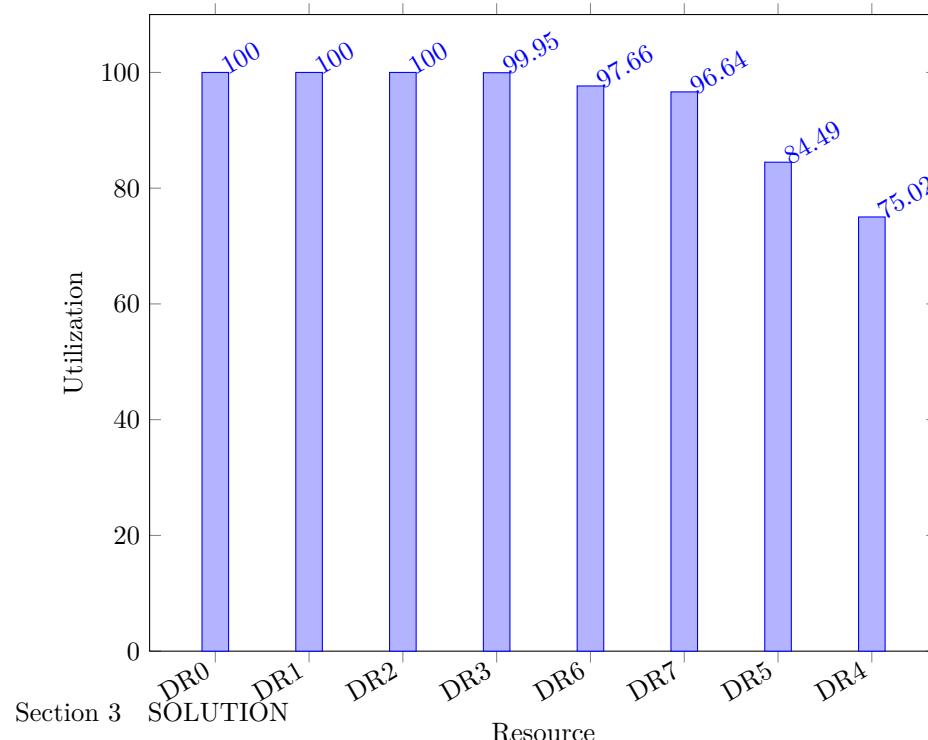


Figure 2: Job Gantt for Solution Sol3 (Part 1 of 2)

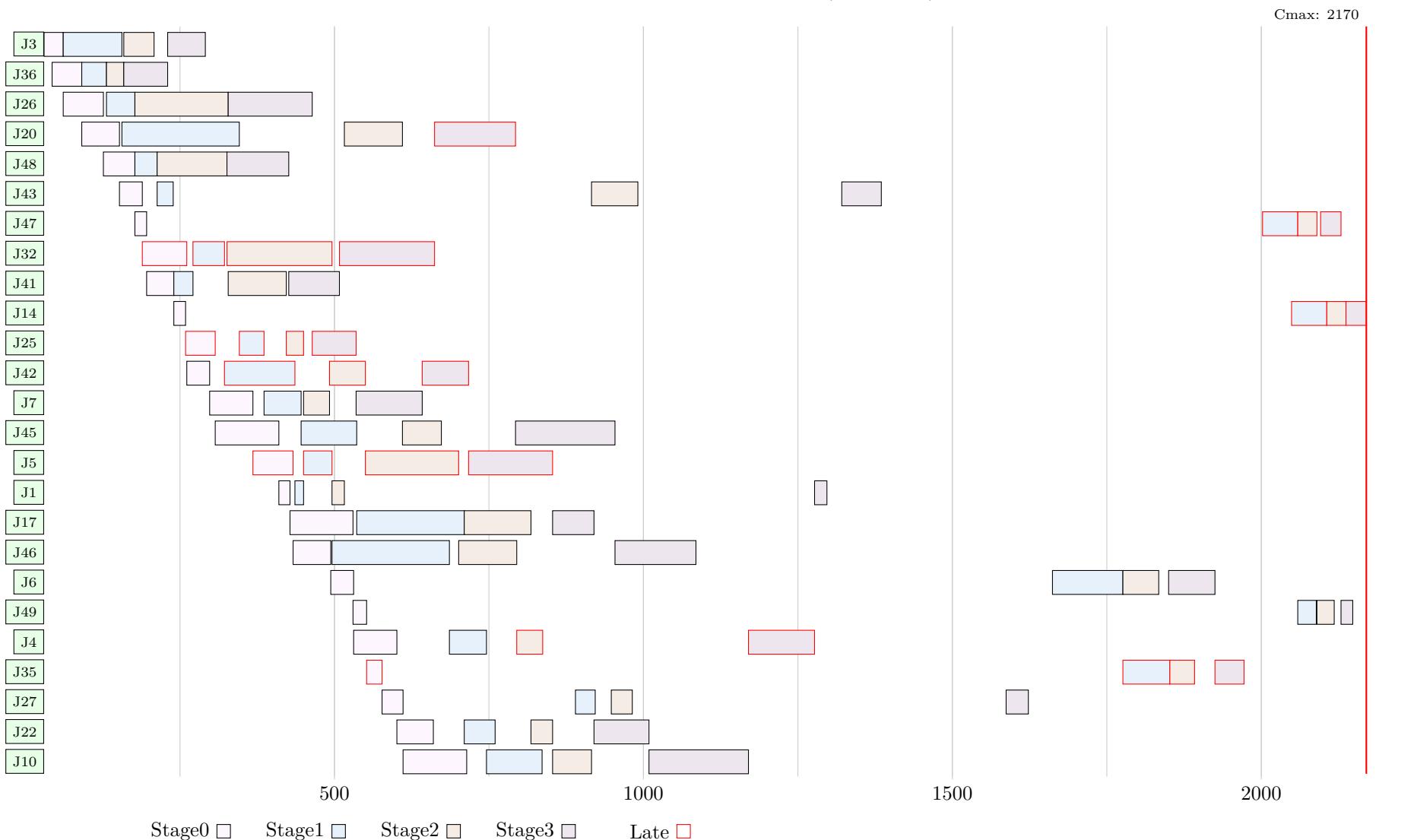


Figure 3: Job Gantt for Solution Sol3 (Part 2 of 2)

