# MIS 6360 Group Project Part 2

# Project Description

The new software-controlled conveyor belt is an exciting project that moves and positions items on a conveyor belt with a high degree of accuracy (< 1 millimeter of error). The proposed project will produce a new system capable of automating the movement of a wide variety of warehouse materials commonly used in order fulfillment. The following information has been developed for you to use in completing the exercises.

# Assumptions and Notes Continued from Part 1

A seven-day workweek is used for the whole year. No holidays.

The project should start on January 1 of the next year.

Resources have identical capabilities and may be substituted for each other. For example, an activity requiring a design resource may be performed by any of the design resources working on the project.

***Warning: Save your work frequently and make backup files as you answer each part.***

***Warning: MS Project leveling options are NOT saved within the project file. Make sure your leveling options are set in Project correctly prior to opening the assignment start file.***

***A screenshot of a computer

Description automatically generated***

# Question 1 (40 points)

After showing your resource-constrained network to top management, they are very disappointed. After some explanation and negotiation, they make the following compromise with you:

The project must be completed in no more than 285 days**. The current duration of the sheet should be 500. The goal is to reduce it down to 285 given the following constraints below:**

* **You may NOT make any changes to tasks 1, 2, 3, or 4.**
* One additional Design resource has already been added to the project.
* If you think it is beneficial, you may assign one additional development resources at the same cost rate as the original development resources.
* If this does not suffice, you may hire other people from the outside. Hire as few additional external people as possible because they cost $75 more per hour than your inside people.
* The scope of the project remains the same and the amount of work for each task may not be changed.
* Task dependencies may NOT be changed.
* Overtime is allowed, but the cost rate is 1.5 times the standard cost rate
* If overtime is used, total working hours may not exceed 16 hours per day
* Splitting of tasks is allowed
* Resources assignments less than 100% are allowed
* ***Activity durations are not fixed meaning adding additional resources to an activity decreases the duration of the activity.***
* ***Your changes should minimize the impact to the overall project cost.***

a. Include a screenshot of your final Gantt chart clearly identifying the critical path. What is the new finish time in number of days? What is the new finish date?

The new finish date is 11th October, 2025. It will take 284 work days for the project to get complete.

b. Paste a screenshot of your resource sheet below and describe all of the changes you made to the resources assigned to your project.

To fulfil the project duration constraint, we have hired an extra “Development” resource and two external resources that can help out the internal Assembly/Test resource in finishing the project in stipulated timeframe.

c. List the changes you made to each task in the project to meet the new project deadline. For each task, clearly describe all changes, if any.

|  |  |
| --- | --- |
| **Description** | **What change(s) did you make to the task?** |
| System architecture | No Changes Made |
| Hardware specifications | No Changes Made |
| Kernel specifications | No Changes Made |
| Utilities Specification | No Changes Made |
| Hardware Design | Doubled the resources that is two person each for Design and Development. |
| Disk drivers | No Changes |
| Memory management | Triple the Management Resource. |
| Operating system documentation | No Changes Made |
| Routine utilities | Doubled the Resource Working on this activity. |
| Complex utilities | No Changes Made |
| Utilities documentation | No Changes Made |
| Hardware documentation | No Changes Made |
| Integration first phase | Doubled the Resource Working on this Activity. External Test resource added. |
| Prototypes | Overtime added for both resources |
| Serial I/O drivers | Doubled the Resource Working on this Activity. |
| System hard/software test | Additional External Test resource plus both the resources are working overtimes. |
| Order printed circuit boards | No Changes Made |
| Network interface | No Changes Made |
| Shell | No Changes Made |
| Project documentation | No Changes Made |
| Assemble preproduction | No Changes Made |
| Integrated acceptance test | Doubled the “Development” Resource and “Test” resource is working overtimes. |

d. What is the total cost of the project?

The Total Cost of the project reduced to **$1,132,515.00.**

e. Include a graph of the total financial schedule over the life of the project by month. This is the planned value for the project. The graph should depict time on the x-axis and dollars on the y-axis over the life of the project.

f. Include a screenshot of the total costs for each activity/work package.



Remember, your financial schedule should follow your resource schedule, not the original network. Because the project has not started yet, all of your variances, schedule, cost, earned value, and actual cost should be zero. Once you are confident that you have the final schedule, save the file as a baseline. (Hint: Save a backup file just in case without baseline!)

# Question 2 (40 points)

Status Report Date: February 28, 2025

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Description** | **Actual Duration** | **Remaining Duration** |
| 1 | System Architecture | 40 | 0 |
| 2 | Hardware specifications | 19 | 45 |
| 3 | Kernel specifications | 19 | 0 |
| 4 | Utilities Specification | 19 | 0 |

1. Include a screenshot of the status in table form that shows the PV, EV, AC, BAC, EAC, SV, CV, SPI, and CPI for (1) each work package and (2) the whole project using the status date listed above the table.



1. Based on the performance of the project team, what are the Estimated Cost at Completion (ECAC) and the Estimated Time at Completion (ETAC) for the project as a whole?

The value of ECAC at the status date is **$ 1,096,253.64**.

The estimated time at completion after the status date is 288 days i.e. October 15th 2025.

c. How is the project as a whole progressing in terms of cost and schedule? Be specific in your response and clearly identify the amount, if any, the project is over/under budget and the schedule change, if any, the project is ahead/behind schedule in number of days.

|  |  |  |  |
| --- | --- | --- | --- |
| **Project Name** | **Original Project Duration** | **Estimated Time at Completion (ETAC)** | **Schedule Difference** |
| SCCB | 284 days | 288 days | 4 days |

|  |  |  |  |
| --- | --- | --- | --- |
| **Project Name** | **Original Project Cost** | **Estimated Cost at Completion (ECAC)** | **Cost Difference** |
| SCCB | $1,132,515.00 | $1,096,253.64 | $36,261.36 |

d. Complete the following table describing the performance of each task in the project so far. For each task, compare the original planned schedule and cost with the actual schedule and cost as of February 28. For tasks that are in progress, please also include the estimated scheduled finish data and the estimated cost at completion and compare these estimates with the original plan.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **Description** | **Original Planned Duration** | **Actual/Estimated Duration at Completion** | **Schedule Difference (Days)** |
| 1 | Architectural Decisions | 40 days | 40 days | 0 days |
| 2 | Hardware specifications | 64 days | 64 days | 0 days |
| 3 | Kernel specifications | 19 days | 19 days | 0 days |
| 4 | Utilities Specification | 19 days | 19 days | 0 days |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **Description** | **Original Planned Cost** | **Actual/Estimated Cost at Completion** | **Cost Difference (Dollars)** |
| 1 | Architectural Decisions | $59,200.00 | $59,200.00 | $0.00 |
| 2 | Hardware specifications | $120,000.00 | $153,600.00 | $-33,600.00 |
| 3 | Kernel specifications | $29,600.00 | $28,120.00 | $1,480.00 |
| 4 | Utilities Specification | $60,000.00 | $45,600.00 | $14,400.00 |

e. Which activities performed as planned? Which activities did not go as planned?

Activity 1 i.e. “Architectural Decisions” performed as planned while all other activities does not go as planned.

f. What changes will you make moving forward to try and bring the project back on track? Be specific in your response clearly identifying the tasks and/or resource changes you plan to make.

The additional resources i.e. External Test resource will be added to Activity 14 and 21. The activity 14 will also see additional overtime for the resources. This will reduce the duration of the project to 284.32 days.

g. Include a Gantt chart of your revised project after making the changes listed in part f.

The highlighted activities has the changes.

h. Describe the change you would make if overtime pay was paid at 2 times base salary instead of 1.5 times base salary. Assume an activity only has 1 resource working 8 hours a day and the task is scheduled to take 20 days. What is the maximum amount of overtime you can assign for this resource on this task? Is it always better to use overtime than to hire an external resource? Why or why not?

If the overtime pay increased to double the base salary, it is more appropriate to use external resources instead of overtime. So, I will use external resources instead of assigning overtimes to internal resources. For a resource working 8 hours a day for 20 working days, we can assign 8 hours of overtime each day so that resource does not have more than 16 hours work for a day. The total amount of overtime hours will be 80 and the total duration can be reduced to 10 working days.

It is better to use overtime for internal resources instead of using external resource. These are some of the reasons;

1. The external resource will charge more than internal resource.
2. Communication gap between the internal and external resource will affect the project performance.