Class: COP 4533
Professor: Laura Cruz Castro
Term: Fall 2023
Student: Jack Mills
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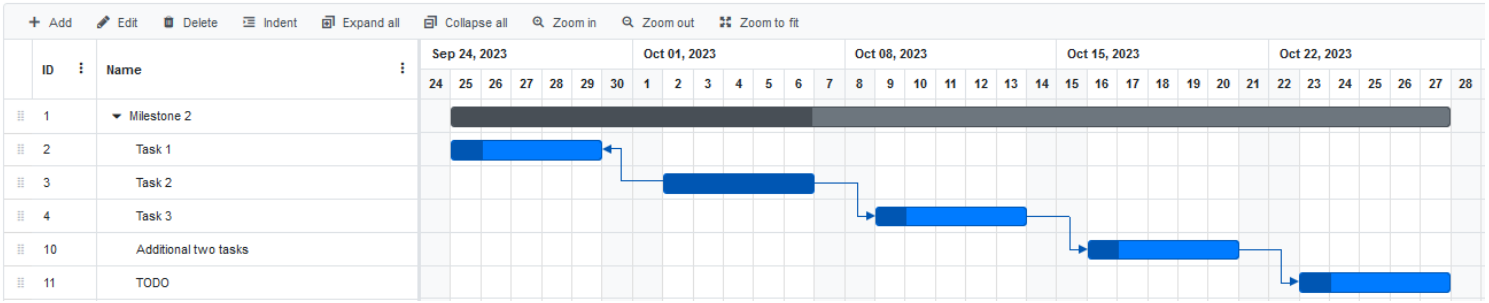
Milestone 1

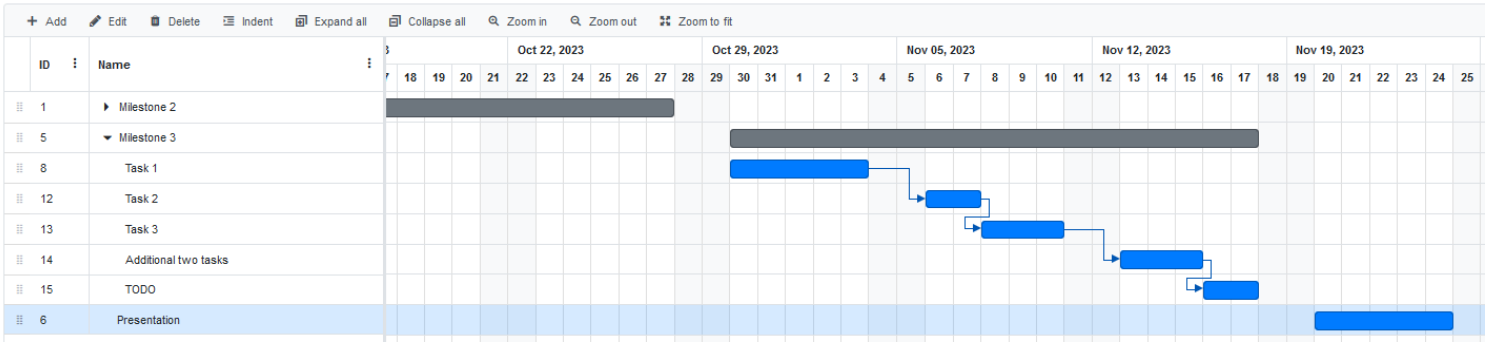
Group Members: Jack Mills UFID3485-7973

Member Roles: I, Jack Mills, am the sole member of my group. So, I'm assuming all Final Project roles.

Communication Method: Not necessary as I'm the only project member.

Project Gantt Chart:





Github Repository Link: https://github.com/jackmillsgator/COP4533FinalProject

Problem 1.

Steps

1.

Stock	Day 1 Price	Day 2 Price	Day 3 Price	Day 4 Price	Day 5 Price
A	12	1	5	3	16
B	4	4	13	4	9
C	6	8	6	1	2
D	14	3	4	8	10

2.

Stock	Calculation	Buy Day 1, Sell Day 2 - Profit
A	1 - 12 = -11	-11
B	4 - 4 = 0	0
C	8 - 6 = 2	2
D	3 - 13 = -11	-11

Stock	Calculation	Buy Day 2, Sell Day 3 - Profit
A	5 - 1 = 4	4
B	13 - 4 = 9	9
C	6 - 8 = -2	-2
D	4 - 3 = -1	1

Stock	Calculation	Buy Day 3, Sell Day 4 - Profit
A	3 - 5 = -2	-2
B	4 - 13 = -9	-9
C	1 - 6 = -5	-5
D	8 - 4 = 4	4

Stock	Calculation	Buy Day 4, Sell Day 5 - Profit
A	16 - 3 = 13	13
B	9 - 4 = 5	5
C	2 - 1 = 1	1
D	10 - 8 = 2	2

3.

If we are selling the stock the day after purchasing it, then the following are the days with the highest potential profit for each stock:

Stock A: Day 5 with a profit of $13

Stock B: Day 3 with a profit of $9

Stock C: Day 2 with a profit of $2

Stock D: Day 4 with a profit of $4

4.

If we are selling the stock the day after purchasing it, then selling Stock A on Day 5 has the highest potential for profit with a profit of $13.

[(1, 4, 5)]

Problem 2.

Steps

1.

Stock	Day 1 Price	Day 2 Price	Day 3 Price	Day 4 Price	Day 5 Price
A	25	30	15	40	50
B	10	20	30	25	5
C	30	45	35	10	15
D	5	50	35	25	45

2.

As confirmed by Professor Cruz in the Discord, we are assuming that k = 3 (3 transactions) in this problem. And as confirmed by Ayush06 in the Discord, we are also assuming that you can only hold one stock at a time.

There are 2 sequences that yield the same maximum amount of profit:

Sequence 1

		Profit
First transaction:	Buy Stock D on Day 1 and Sell on Day 2	$45
Second Transaction:	Buy Stock B on Day 2 and Sell on Day 3	$10
Third Transaction:	Buy Stock A on Day 3 and Sell on Day 5	$35
Net Profit:		$90

Sequence 2

		Profit
First transaction:	Buy Stock D on Day 1 and Sell on Day 2	$45
Second Transaction:	Buy Stock A on Day 3 and Sell on Day 4	$25
Third Transaction:	Buy Stock D on Day 4 and Sell on Day 5	$20
Net Profit:		$90

3.

[(4, 1, 2), (2, 2, 3), (1, 3, 5)]

AND

[(4, 1, 2), (1, 3, 4), (4, 4, 5)]

Problem 3.

Steps

1.

Stock	Day 1 Price	Day 2 Price	Day 3 Price	Day 4 Price	Day 5 Price	Day 6 Price	Day 7 Price
A	7	1	5	3	6	8	9
B	2	4	3	7	9	1	8
C	5	8	9	1	2	3	10
D	9	3	4	8	7	4	1
E	3	1	5	8	9	6	4

c = 2

2.

Stock	Calculation	Day 1 - Max Profit After c + 1 Days
A	9 - 7 = 2	2
B	9 - 2 = 7	7
C	10 - 5 = 5	5
D	8 - 9 = -1	-1
E	9 - 3 = 6	6

Stock	Calculation	Day 2 - Max Profit After c + 1 Days
A	9 - 1 = 8	8
B	9 - 4 = 5	5
C	10 - 8 = 2	2
D	7 - 3 = 4	4
E	9 - 1 = 8	8

Stock	Calculation	Day 3 - Max Profit After c + 1 Days
A	9 - 5 = 4	4
B	8 - 3 = 5	5
C	10 - 9 = 1	1
D	4 - 4 = 0	0
E	6 - 5 = 1	1

Stock	Calculation	Day 4 - Max Profit After c + 1 Days
A	9 - 3 = 6	6
B	8 - 7 = 1	1
C	10 - 1 = 9	9
D	1 - 8 = -7	-7
E	4 - 8 = -4	-4

3.

There are 5 sequences that yields the same maximum amount of profit:

Sequence 1

		Profit
First transaction:	Buy Stock C on Day 1 and sell on Day 2	$3
	Wait till Day 5 (i = 2 so i + c + 1 = 2 + 2 + 1 = 5 as in waiting till Day 5)	
Second transaction:	Buy Stock C on Day 5 and sell on Day 7	$8
Net profit:		$11

Sequence 2

First transaction:	Buy Stock A on Day 2 and sell on Day 3	$4
	Wait till Day 5 (i = 3 so i + c + 1 = 3 + 2 + 1 = 6 as in waiting till Day 6)	
Second transaction:	Buy Stock B on Day 6 and sell on Day 7	$7
Net profit:		$11

Sequence 3

First transaction:	Buy Stock A on Day 2 and sell on Day 3	$4
	Wait till Day 5 (i = 3 so i + c + 1 = 3 + 2 + 1 = 6 as in waiting till Day 6)	
Second transaction:	Buy Stock C on Day 6 and sell on Day 7	$7
Net profit:		$11

Sequence 4

First transaction:	Buy Stock E on Day 2 and sell on Day 3	$4
	Wait till Day 5 (i = 3 so i + c + 1 = 3 + 2 + 1 = 6 as in waiting till Day 6)	
Second transaction:	Buy Stock B on Day 6 and sell on Day 7	$7
Net profit:		$11

Sequence 5

First transaction:	Buy Stock E on Day 2 and sell on Day 3	$4
	Wait till Day 5 (i = 3 so i + c + 1 = 3 + 2 + 1 = 6 as in waiting till Day 6)	
Second transaction:	Buy Stock C on Day 6 and sell on Day 7	$7
Net profit:	$11	

3.

[(3, 1, 2), (3, 5, 7)]

AND

[(1, 2, 3), (2, 6, 7)]

AND

[(1, 2, 3), (3, 6, 7)]

AND

[(5, 2, 3), (2, 6, 7)]

AND

[(5, 2, 3), (3, 6, 7)]