MATH 380 Presentation

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Government Client: Bob Ernst

Internship Objectives:

1. Apply mathematics concepts, principles, and tools to various company projects using real-world constraints and guidelines.
2. Apply the knowledge and experience gained from the internship towards completion of degree at Salisbury University.
3. Learn effective leadership strategies for future growth.

KBRwyle

- 7,000 employees; nationwide and overseas
- Founded in 1949
- #1 systems engineering and technical assistance provider to U.S. Naval Aviation
- #1 advisory and assistance services provider to Army Aviation and the U.S. Army Air and Missile Defense.
- #1 life sciences provider to NASA.
- Areas of expertise:
  - Systems and sustainment engineering
  - Program and acquisition management
  - Life science research
  - Space medical operations
  - Information technology
  - Test and evaluation of aircraft, weapon systems, and networks
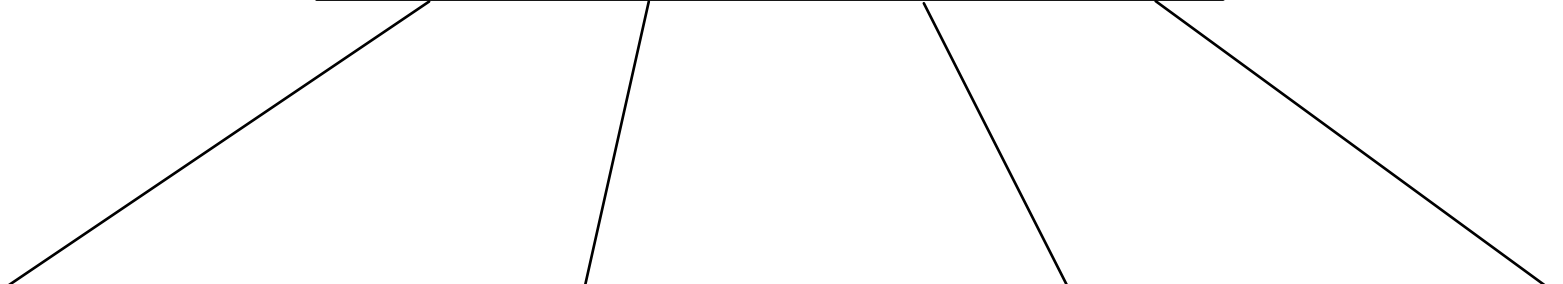
My Tasks:

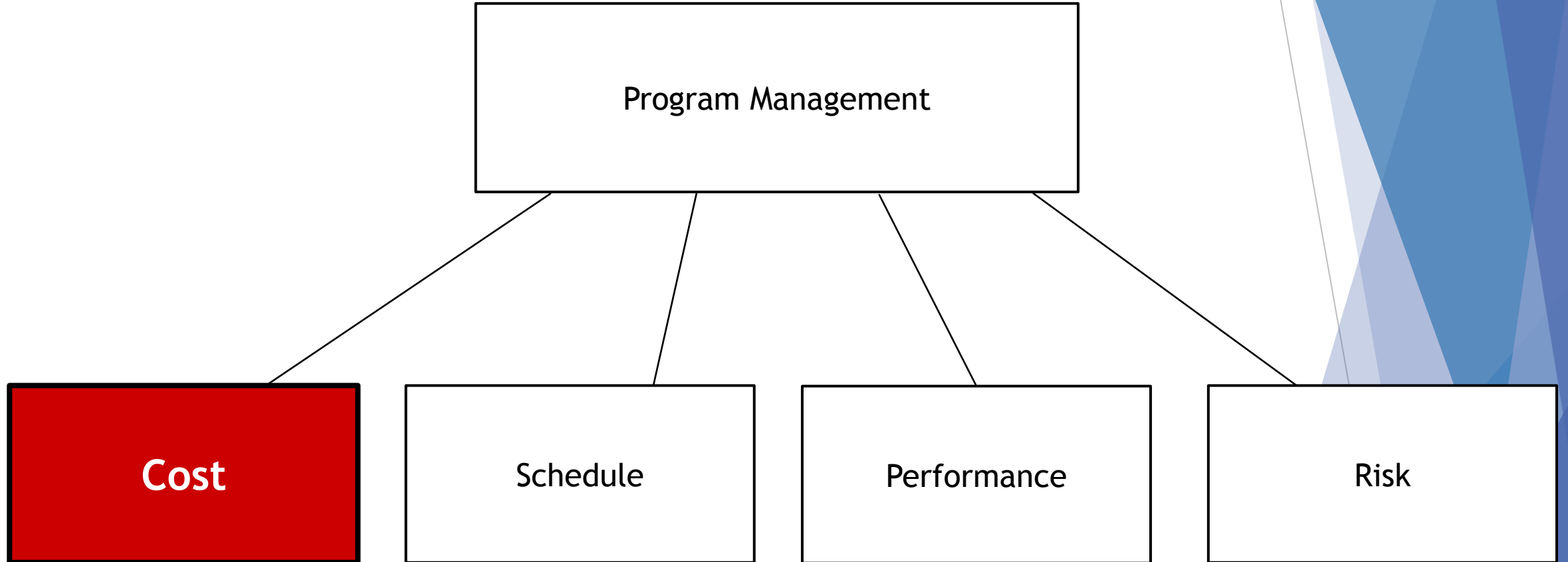▶ Write abstracts for company papers

▶ Read proposals thoroughly

▶ Program management cost

▶ Travel cost estimation

- **Program management cost**
  - Understand method of estimation
  - Question and verify the estimation

- ▶ **Travel cost estimation**
  - ▶ Understand method of estimation
  - ▶ Question and verify the estimation
  - ▶ Ask what assumptions are being made/should be made?
  - ▶ Determine a better method for estimation
  - ▶ Use low and high estimates to bound the estimates risk
  - ▶ Write up findings in evaluation sheet

Travel Cost Estimation

Assumptions made:

- Tasks 1, 2, and 3 are traveling to Location 1.
- Task 4 is traveling to Location 2.
- Airfare
    - Refundable ticket
    - Non-stop ticket
    - $Airfare\ cost = airfare\ rate * (\#\ of\ ppl)$
- Rental Car
    - Compact Car
    - Using kayak.com
    - Rent from noon to noon
    - One car for every two people: $\left(\frac{(\#\ of\ ppl)}{2}\right)$ (round up to nearest whole number)
    - $Rental\ Car\ cost = \left(\frac{(\#\ of\ ppl)}{2}\right) * car\ rate * \#\ of\ days$

- Per Diem (Meals, daily living costs, etc.)
    - Per diem rates found at www.defensetravel.dod.mil
    - $Per\ diem\ cost = (\#\ of\ days - 0.5) * \#\ of\ ppl * per\ diem\ rate$
- Hotel
    - One room per person
    - $Hotel\ cost = of\ ppl * (\#\ of\ days - 1) * hotel\ rate$
- Low rate vs High rate
    - If the proposed rate is lower than the lowest rate found, we calculate the proposed rate as the low rate.
    - If the proposed rate is higher than the highest rate found, we did not use the proposed rate.
- Proposed Price vs Propose cost
    - $proposed\ price = cost * fee$
    - $proposed\ fee = .1(cost)$

Travel Cost by Task

TASK ID	Source Item	Resource Description	Ppl	Day	COM	10%	Proposed Rate	Proposed Cost	Proposed Fee	Proposed Price	Low rate	Gov Low Cost	Gov Low Fee	Gov Low Price	High Rate	Gov Hi Cost	Gov Hi Fee	Gov Hi Price	Proposed Cost Total	Gov. Low Cost Total	Gov. High Cost Total
Task 1 (2 ppl, 1 trip)	Airfare	Dir Expense Travel-AF	2	4	9.57	10%	X1	X1*2	.1(cost)	Cost+Fee	Y1	Y1*2	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*2	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	2	4	1.49	10%	X2	X2*1*4	.1(cost)	Cost+Fee	Y2	Y2*4*1	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*1*4	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	2	4	2.93	10%	X3	X3*3.5*2	.1(cost)	Cost+Fee	Y3	Y3*3.5*2	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*3.5*2	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	2	4	4.85	10%	X4	X4*2*3	.1(cost)	Cost+Fee	X4	X4*2*3	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*2*3	(high-COM)*.1	high cost+high fee	XXX	XXX	XXX
Task 2 (5 ppl, 3 trips)	Airfare	Dir Expense Travel-AF	3	3	12.87	10%	X1	X1*3	.1(cost)	Cost+Fee	Y1	Y1*3	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*3	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	3	3	2.04	10%	X2	X2*2*3	.1(cost)	Cost+Fee	Y2	Y2*3*2	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*2*3	(high-COM)*.1	high cost+high fee			
	Airfare	Dir Expense Travel-AF	1	3	4.29	10%	X1	X1*1	.1(cost)	Cost+Fee	Y1	Y1*1	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*1	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	1	3	1.02	10%	X2	X2*1*3	.1(cost)	Cost+Fee	Y2	Y2*3*1	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*1*3	(high-COM)*.1	high cost+high fee			
	Airfare	Dir Expense Travel-AF	1	3	4.29	10%	X1	X1*1	.1(cost)	Cost+Fee	Y1	Y1*1	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*1	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	1	3	1.02	10%	X2	X2*1*3	.1(cost)	Cost+Fee	Y2	Y2*3*1	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*1*3	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	3	3	2.87	10%	X3	X3*2.5*3	.1(cost)	Cost+Fee	Y3	Y3*2.5*3	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*2.5*3	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	3	3	4.44	10%	X4	X4*3*2	.1(cost)	Cost+Fee	X4	X4*3*2	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*3*2	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	1	3	0.96	10%	X3	X3*2.5*1	.1(cost)	Cost+Fee	Y3	Y3*2.5*1	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*2.5*1	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	1	3	1.48	10%	X4	X4*1*2	.1(cost)	Cost+Fee	X4	X4*1*2	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*1*2	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	1	3	0.96	10%	X3	X3*2.5*1	.1(cost)	Cost+Fee	Y3	Y3*2.5*1	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*2.5*1	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	1	3	1.48	10%	X4	X4*1*2	.1(cost)	Cost+Fee	X4	X4*1*2	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*1*2	(high-COM)*.1	high cost+high fee	XXX	XXX	XXX
Task 3 (4 ppl, 3 trips)	Airfare	Dir Expense Travel- AF	3	14	12.87	10%	X1	X1*3	.1(cost)	Cost+Fee	Y1	Y1*3	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*3	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel - RC	3	14	9.53	10%	X2	X2*2*14	.1(cost)	Cost+Fee	Y2	Y2*14*2	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*2*14	(high-COM)*.1	high cost+high fee			
	Airfare	Dir Expense Travel-AF	3	14	12.87	10%	X1	X1*3	.1(cost)	Cost+Fee	Y1	Y1*3	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*3	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	3	14	9.53	10%	X2	X2*2*14	.1(cost)	Cost+Fee	Y2	Y2*14*2	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*2*14	(high-COM)*.1	high cost+high fee			
	Airfare	Dir Expense Travel-AF	3	14	12.87	10%	X1	X1*3	.1(cost)	Cost+Fee	Y1	Y1*3	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*3	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	3	14	9.53	10%	X2	X2*2*14	.1(cost)	Cost+Fee	Y2	Y2*14*2	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*2*14	(high-COM)*.1	high cost+high fee			
	Airfare	Dir Expense Travel-AF	1	14	4.29	10%	X1	X1*1	.1(cost)	Cost+Fee	Y1	Y1*1	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*1	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	1	14	4.76	10%	X2	X2*1*14	.1(cost)	Cost+Fee	Y2	Y2*14*1	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*1*14	(high-COM)*.1	high cost+high fee			
	Airfare	Dir Expense Travel-AF	1	14	4.29	10%	X1	X1*1	.1(cost)	Cost+Fee	Y1	Y1*1	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*1	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	1	14	4.76	10%	X2	X2*1*14	.1(cost)	Cost+Fee	Y2	Y2*14*1	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*1*14	(high-COM)*.1	high cost+high fee			
	Airfare	Dir Expense Travel-AF	1	14	4.29	10%	X1	X1*1	.1(cost)	Cost+Fee	Y1	Y1*1	(low-COM)*.1	Low cost+ Low fee	Z1	Z1*1	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	1	14	4.76	10%	X2	X2*1*14	.1(cost)	Cost+Fee	Y2	Y2*14*1	(low-COM)*.1	Low cost+ Low fee	Z2	Z2*1*14	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	3	14	15.49	10%	X3	X3*13.5*3	.1(cost)	Cost+Fee	Y3	Y3*13.5*3	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*13.5*3	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	3	14	28.87	10%	X4	X4*3*13	.1(cost)	Cost+Fee	X4	X4*3*13	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*3*13	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	3	14	15.49	10%	X3	X3*13.5*3	.1(cost)	Cost+Fee	Y3	Y3*13.5*3	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*13.5*3	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	3	14	28.87	10%	X4	X4*3*13	.1(cost)	Cost+Fee	X4	X4*3*13	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*3*13	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	3	14	15.49	10%	X3	X3*13.5*3	.1(cost)	Cost+Fee	Y3	Y3*13.5*3	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*13.5*3	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	3	14	28.87	10%	X4	X4*3*13	.1(cost)	Cost+Fee	X4	X4*3*13	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*3*13	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	1	14	5.16	10%	X3	X3*13.5*1	.1(cost)	Cost+Fee	Y3	Y3*13.5*1	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*13.5*1	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	1	14	9.62	10%	X4	X4*1*13	.1(cost)	Cost+Fee	X4	X4*1*13	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*1*13	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	1	14	5.16	10%	X3	X3*13.5*1	.1(cost)	Cost+Fee	Y3	Y3*13.5*1	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*13.5*1	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	1	14	9.62	10%	X4	X4*1*13	.1(cost)	Cost+Fee	X4	X4*1*13	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*1*13	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	1	14	5.16	10%	X3	X3*13.5*1	.1(cost)	Cost+Fee	Y3	Y3*13.5*1	(low-COM)*.1	Low cost+ Low fee	Z3	Z3*13.5*1	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	1	14	9.62	10%	X4	X4*1*13	.1(cost)	Cost+Fee	X4	X4*1*13	(low-COM)*.1	Low cost+ Low fee	Z4	Z4*1*13	(high-COM)*.1	high cost+high fee	XXX	XXX	XXX
Task 4 (1 ppl, 1 trip)	Airfare	Dir Expense Travel-AF	1	3	4.29	10%	X5	X5*1	.1(cost)	Cost+Fee	X5	X5*1	(low-COM)*.1	Low cost+ Low fee	Z5	Z5*1	(high-COM)*.1	high cost+high fee			
	Rental Car	Dir Expense Travel-RC	1	3	0.41	10%	X6	X6*1*3	.1(cost)	Cost+Fee	X6	X6*1*3	(low-COM)*.1	Low cost+ Low fee	Z6	Z6*1*3	(high-COM)*.1	high cost+high fee			
	Per Diem	Dir Expense Per Diem	1	3	0.61	10%	X7	X7*2.5*1	.1(cost)	Cost+Fee	Y4	Y4*2.5*1	(low-COM)*.1	Low cost+ Low fee	Z7	Z7*2.5*1	(high-COM)*.1	high cost+high fee			
	Hotel	Dir Expense Per Diem-HT	1	3	1.24	10%	X8	X8*1*2	.1(cost)	Cost+Fee	X8	X8*1*2	(low-COM)*.1	Low cost+ Low fee	Z8	Z8*1*2	(high-COM)*.1	high cost+high fee	XXX	XXX	XXX

Challenges of Internship

- Learning the U.S. Navy Acronyms
  - Ex: Flat top, NAVAIR, POTUS, etc.
- Communicating effectively with the client
  - Their time is limited and so is ours. It is important to communicated efficiently the first time.
- Knowing where to go when I did not have necessary information.
  - Ex: Many of the assumptions made for travel cost (non-stop refundable ticket, one room per person, one car for two people, etc.) I did not know. First, I went to one of my Wyle Supervisors, Ajay or Greg, who further referred me to the cost department in 4.2.

How Salisbury University Classroom Experience Helped in My KBRwyle Internship?

- Knowledge of Excel and how to efficiently use it

- Math 465 (Mathematics Models and Applications):
  - "Blue Sky"- Everything we know
  - Decide what factors we still need to know
  - Determine Assumptions
  - Determine a method for estimating

- Writing Abstracts (Math 406, Math 441, Math 451, Math 465)

What I learned

- To Apply mathematics concepts, principles, and tools to various company projects using real-world constraints and guidelines.
    - Ex: Applying what I learned from Math 465 to the internship process.
- Apply the knowledge and experience gained from the internship towards completion of degree at Salisbury University.
    - Ex: I have become a better writer, critical thinker, and communicator throughout my time at KBRwyle. This not only applies to my remaining mathematics courses, but also to my experiences as a future educator.
- Learn effective leadership strategies for future growth.
    - Ex: Team meetings- Every Week we would have "all hands" meetings to discuss the proposal, the next stages of the proposal, and what was expected as an "end goal". This allowed for all team members to share their progress with the proposal, while also keeping all team members on track to reach the end goal.