Exercises for the Final Exam

Question 1: Rating College Football Teams

Consider the following variation of the Rating College Football Teams example we discussed in class. Suppose the home team (column F) and the visiting team (column G) are represented by *Team Index* (as opposed to *Team Name* in the class example).

A	В	С	D E	F	G	Н	l I	J	K	L
Rating College Foot	tball Teams (2012)		Objective to minimi							
			Sum squared errors							
Home game advantag	ge									
			Results of games						Model prediction	ons and err
Constraint on average	e rating (any nominal value	e could be us		Home Team	Visiting Team	Home Team Score	Visiting Team Score	Point spread		
Actual average			1	2	18	14	56	1	1	1
ricidal average	=		1	10	27	37	26			
N7	100			114	89	13	17			
Nominal average	100		1							
			1	84	109	24	49			
Ratings of teams			1	24	53	37	0			
Team Index	Team Name	Rating	1	16	119	30	6			
1	Air Force		1	110	60	27	30			
2	Akron		1	70	98	21	35			
3	Alabama		1	58	12	17	13			
4	Arizona		1	94	87	20	17			
5	Arizona State		1	64	74	10	50			
6	Arkansas		1	38	122	24	7			
7	Arkansas State		1	41	107	38	23			
8	Army		1	108	105	29	39			
9	Auburn		1	76	56	56	10			
10	Ball State		1	81	75	14	24			
11	Baylor		1	95	73	41	42			
12	Boise State		1	120	51	69	34			
123 124	Wisconsin Wyoming		3 3	87	23	40	20			
			2							
	** yourning		3	50	37	63	14			
	w youning		3	61	99	63	66			
••	Wyoning		3	61	99	31	66			
••	Wyoning		3	61 91	99	31	22			
	wyoning.		13 13	91 87	99 74 46	13 52	22 23			
	wyoning.		13 13 13	91 87 35	74 46 110	13 52 48	22 23 10			
	wyoning .		13 13 13 14	91 87 35 85	74 46 110 49	13 52 48 17	22 23 10 20			
	wyoning .		13 13 13 14 14	91 87 35 85 44	74 46 110 49 72	13 52 48 17 37	22 23 10 20 44			
	wyoning .		13 13 13 14 14 14	91 87 35 85 44 94	74 46 110 49 72 109	13 52 48 17 37 27	22 23 10 20 44 24			
	wyoning.		13 13 13 14 14 14 14	91 87 35 85 44 94	74 46 110 49 72 109 77	13 52 48 17 37 27 17	22 23 10 20 44 24 24			
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What's the formula for cell K6?

Question 2: Rating College Football Teams (continued)

Specify solver for the Rating Colle	ge Football Teams problem below:
Set Objective:	
To: O Max O Min O By Changing Variable Cells:	
Subject to the Constraints:	
☐ Make Unconstrained Variables	Non-Negative
Select a Solving Method:	•
<u> </u>	
Based on your rating results, list th	e top 3 college football teams below
Rank	Team
1	
2	
3	
What's the rank for Notre Dame?	

Question 3: Crew Scheduling

Consider the following variation of the crew scheduling example we discussed in class:

Bob and Mary are more experienced than the other workers. Therefore the manager would like to give them higher priority during crew scheduling. In other words, when calculating the overall worker satisfaction, more weights would be assigned to the preferences of Bob and Mary. We refer to these new weights as "Priority Adjusted Weights" in the Excel file. The preferences of Bob and Mary (with priority level 2) would matter *twice as much as* the other workers (with priority level 1).

4	A	В	С	D	Е	F	G	HIJK	LMNO	PQ R	S	Τl	JV	W X Y	ZA	VAEA	CALAE	AF A	G AH	Al /	AJ AI	ALA	NANA	CAFA	CAFA	SAT	AU A	WAV	AX
	Crew Scheduling																												
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	Worker Satisfaction													Pro	pos		wo-W			ules	_								
4										ay shift							ening									shift			
5								1 2 3	4 5 6 7	8 9 10	11	12 1	3 14	1 2 3	3 4 :	5 6	7 8 9	10 1	1 12	13	14 1	2 3	4 5	6 7	7 8 9	9 10	11	12 13	14
6			_	Priority Adjusted Weights	Sch Limit	Sch Limit Targets	Variables														-								
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	S_{I}	pecify th	ne fo	llowing cells (a	ıll forr	nulas):				-																			
	D	7:						E	E7:																				
	I2	6:						C	23:																				

Question 4: Crew Scheduling (continued)

Specify solver	for the Crew S	cheduling problem be	elow:	
Set Objective:				
To: ○ Max	O Min	O Value of:		
By Changing V	Variable Cells:			
Subject to the	Constraints:			
☐ Make Unco	nstrained Varia	ables Non-Negative		
Select a Solvin	g Method:			

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Question 5: Roulette

Consider the following variation of the optimal target hitting strategy in the Roulette example we discussed in class:

- Suppose you have \$200 and you would like to hit the target of \$300.
- Instead of betting on Red or Black, you would like to bet on the 1st Dozen (1-12).

Hint: Since the payoff is 2:1 for the dozen bets, the optimal target hitting strategy should be updated to "Bet *half* of the difference between your current winning and the target if you have enough money; otherwise, bet all you have."

4	А	В	С	D	E	F	G	Н	I	J
	Optimal Target	t Hitting Strategy								
)										
3	Outcome		Prob.		Target		Bet #	Bet size	Spin result	Winnings
ļ	1	(your choice: 1st 12)		1	300		0			20
5	2	(2nd 12)					1			
;		(3rd 12)					2			
7		(0 or 00)					3			
3							4			
)	Final outcome						5			
0							6			
	Number of bets						7			
2	rumber of bets						8			
3							9			
1							10			
5							11			
;							12			
7							13			
3							14			
9							15			
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6							22			
7							23			
3							24			
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)							26			
1							27			
2							28			
3							29			
4							30			

specify the following co	ciis (aii iiuiiiocis).		
Cell C4:	Cell C5:	Cell C6:	Cell C7:
Submission Attempts:			

Question 6: Roulette (continued)

Specify	fy the following cells (all formulas):	
H5:		
I5:		
J5:		
B9:	- <u></u>	
R11.		

Question 7: Roulette (continued)

Run your @Risk model and answer the following questions based on the simulation results.
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a. What's the probability of hitting the target?

b. Suppose you would stop betting either when you hit the target or you lose your \$200. What's average number of bets you could place?