Additional Problems: Chapter Thirteen: Qualitative

13S.1

PacRim Electronics, a San Francisco company, is looking for a salesperson to market their products to Pacific Rim countries. They have obtained a stack of resumes from possible candidates, and have narrowed it down to seven. But this is still too many to interview, so they want to eliminate the *inefficient* alternatives. They develop the following table showing the relevant characteristics of each candidate. Fluency in several Pacific Rim languages is desirable; the candidates have been ranked as *fluent* (`F'), *competent* (`C'), *passable* (`P'), or *none* (`N'). The company intends to market to all of the countries whose languages are listed, and rates them all as equally important. Some of the candidates are currently living outside North America, and would have to be flown in for interview.

Candidate Name	Desired Salary	Language skills	Experience	Interview Cost
Leo Wu	$120 000	English (F), Mandarin (F)	20 years	High
Bruce Smith	$95 000	English (F)	5 years	Low
Mary Ng	$105 000	English (C), Vietnamese (F), Mandarin (P)	17 years	Medium
Kevin Ishiguru	$80 000	English (F), Japanese (F)	8 years	Low
Lee Kyung Sook	$115 000	English (F), Korean (F),	16 years	Medium
Leila Khan	$135 000	English (F), Japanese(P)	19 years	High
Andy Patterson	$70 000	English (F)	9 years	Low

Use efficiency analysis to eliminate the dominated alternatives.

*13S.2

Referring to the same scenario as in Question 13S.1, PacRim has decided that it wants to rank the candidates remaining after the efficiency analysis in order of preference, and to interview them in that order. The interviewing committee agree that experience is the most important criterion, followed by language skills; desired salary is less important, and interview cost is relatively insignificant. They assign the four criteria weights of 4, 3, 2 and 1.

The committee initially agree to use normalization to rank the desired salaries and the candidates' years of experience, and devise a scoring scheme for language skills: fluency in each language spoken counts for 4 points, while competence counts for 3 and passable skills for 2. They will also assign 10 points to low interview costs, 5 for medium interview costs, and 0 for high interview costs. What is the resulting ranking of candidates?

After seeing the results of this analysis, some committee members feel the result is unsatisfactory. They suggest dividing starting salaries into three classes, `Low' (70K to 90K), `Medium' (90 K to 110 K) and `High' (above 110 K), and awarding 10, 6, and 3 points to these respectively. They further suggest dividing experience into `Little' (less than 9 years), `Medium' (9-15 years), and `Long' (above 15 years), and assigning 3, 6, and 10 points to these categories respectively.

What ranking results from the revised classification scheme?

13S.3

Park Iseul has just completed a Masters degree in Library Science. She has had four job offers, but is finding it difficult to choose between them. She discusses the problem with her room-mate, Lee Kyung Sook, who is currently taking a course in Engineering Economics.

"What factors are you considering?" asks Lee.

"The salary is one factor, of course," says Park, "Megacorp has offered me $10 000 a month, and none of the others come close to that. And they also have the best prospects for promotion. But really, the most important thing to me is the atmosphere at work. Megacorp seems very cold and unfriendly. And the next most important thing is the distance I have to commute – Megacorp is a long way away, I don't want to spend all my time travelling."

"I can help you make the decision," says Lee, "All we need to do is to construct a decision matrix. You give me all the details, and I'll enter them on a spreadsheet right now."

Lee constructs the decision matrix shown below, corresponding to spreadsheet **13S.3.xls.**

Salary	Commute	Atmosphere	Prospects	Score
10 000	60	1	4	20 191
6 000	5	3	1	12 029
6 500	25	4	2	13 095
8 500	35	2	3	17 119
2	3	4	2	

"There you are," she says, "This shows you should take the job with Megacorp."

"Are you sure?" asks Park.

"Yes, quite sure," says Lee, "Look, I've entered the details just as you told me, and I've used the weights in the bottom row to reflect the factors you said were most important."

Is Lee's matrix a good guide to making the decision? If not, what changes should be made to improve it? What decision does the improved matrix support?

*13S.4

The workers on the election team of Dwight Hokum, a candidate in the upcoming presidential elections in the democratic nation of Placidia, have conducted a voter survey to determine where he stands in the public eye, and which aspects of his image require improvement. Five candidates are running, including Mr Hokum. The pollsters have determined that the most important characteristics in a candidate are charisma, eloquence, experience, and wealth. They conduct a series of voter surveys to establish how the voters rank the candidates with respect to these characteristics, and also to see which of the characteristics is most important.

The PCMs constructed from the voter survey are shown on spreadsheet **13S4a.xls**. Normalize and average these PCM's to obtain a final ranking. Who is the current front runner in public opinion, and what aspects of Mr Hokum's image should he work on to maintain or improve his position?

Calculate the consistency ratio for each of the PCM's. Is the public consistent in its stated preferences?

PCM for Charisma		Hokum	Noble	Hoag	Stellenbosch	Fruitbat
	Hokum	1.00	0.33	0.50	1.00	4.00
	Noble	3.00	1.00	2.00	3.00	5.00
	Hoag	2.00	0.50	1.00	0.75	2.00
	Stellenbosch	1.00	0.33	1.33	1.00	3.00
	Fruitbat	0.25	0.20	0.50	0.33	1.00

PCM for Eloquence		Hokum	Noble	Hoag	Stellenbosch	Fruitbat
	Hokum	1.00	0.25	1.50	2.00	5.00
	Noble	4.00	1.00	3.00	1.00	6.00
	Hoag	0.67	0.33	1.00	0.50	1.00
	Stellenbosch	0.50	1.00	2.00	1.00	2.00
	Fruitbat	0.20	0.17	1.00	0.50	1.00

PCM for Experience		Hokum	Noble	Hoag	Stellenbosch	Fruitbat
	Hokum	1.00	2.00	1.25	1.50	1.50
	Noble	0.50	1.00	0.75	1.00	1.00
	Hoag	0.80	1.33	1.00	1.20	1.00
	Stellenbosch	0.67	1.00	0.83	1.00	1.20
	Fruitbat	0.67	1.00	1.00	0.83	1.00

PCM for Wealth		Hokum	Noble	Hoag	Stellenbosch	Fruitbat
	Hokum	1.00	2.00	3.00	0.50	0.20
	Noble	0.50	1.00	1.50	0.25	0.10
	Hoag	0.33	0.67	1.00	0.75	0.10
	Stellenbosch	2.00	4.00	1.33	1.00	0.50
	Fruitbat	5.00	10.00	10.00	2.00	1.00

PCM for Goal		Charisma	Eloquence	Experience	Wealth
	Charisma	1.00	2.00	0.50	0.50
	Eloquence	0.50	1.00	0.25	0.25
	Experience	2.00	4.00	1.00	1.00
	Wealth	2.00	4.00	1.00	1.00

13S.5

Winston Noble, newly-elected President of Placidia, is consulting with his cabinet on the question of who should lead the negotiating team in negotiations with their hostile neighbour, Termitia. The cabinet are agreed that the leader must have strong diplomatic skills, but must also understand the economic relationship between the two countries. Lastly, whoever they choose must be prepared to consider military options.

The cabinet divides into three sub-committees, which review the qualities needed in a diplomat, an economic analyst, and a military expert respectively. The diplomatic sub-committee decides that the qualities they are looking for are insight, tact and cunning. The economic sub-committee decides to rank the candidates on the basis of mathematical ability, academic background in economics, and business experience. Lastly, the military sub-committee agrees that it will look for intelligence, military experience, and leadership qualities. Each member of each committee fills in a questionnaire giving their assessments of the relative importance of each selected trait in selecting their candidate.

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Diplomacy subcommittee			
Insight		White	Winthrop	Zed
	White	1.00	1.00	5.00
	Winthrop	1.00	1.00	4.00
	Zed	0.20	0.25	1.00
Tact		White	Winthrop	Zed
	White	1.00	0.20	6.00
	Winthrop	5.00	1.00	9.00
	Zed	0.17	0.11	1.00
Cunning		White	Winthrop	Zed
	White	1.00	2.00	0.33
	Winthrop	0.50	1.00	0.20
	Zed	3.03	5.00	1.00
PCM for Goal		Insight	Tact	Cunning
	Insight	1.00	2.00	2.00
	Tact	0.50	1.00	1.00
	Cunning	0.50	1.00	1.00

Economics subcommittee			
Maths Ability	White	Winthrop	Zed
White	1.00	0.20	2.00
Winthrop	5.00	1.00	8.00
Zed	0.50	0.13	1.00
Economic Background	White	Winthrop	Zed
White	1.00	0.50	3.00
Winthrop	2.00	1.00	6.00
Zed	0.33	0.17	1.00
Business Experience	White	Winthrop	Zed
White	1.00	2.00	6.00
Winthrop	0.50	1.00	4.00
Zed	0.17	0.25	1.00
PCM for Goal	Math	Economics	Bus. Exp.
Math	1.00	0.50	0.35
Econ.	2.00	1.00	0.60
Bus. Exp	2.86	1.67	1.00

After an initial selection process, three people emerge as potential leaders of the negotiating team: General Julius Zed, Dr Mary Winthrop, and Lord White. Each committee interviews the three contenders, ranks them using AHP ,and submits a report to President Noble. With these three reports in front of him, the President adds a third level to the decision hierarchy and constructs a master spreadsheet to use as a guide to his decision.

The spreadsheets developed by the three committees, and the President's master spreadsheet, are shown in **13S5a.xls.** If the President consistently applies his own preferences and those of the subcommittees, who will he select to lead the team?

Military subcommittee

Intelligence

	White	Winthrop	Zed
White	1.00	0.90	1.50
Winthrop	1.11	1.00	2.00
Zed	0.67	0.50	1.00

Military Experience

	White	Winthrop	Zed
White	1.00	1.00	0.11
Winthrop	1.00	1.00	0.11
Zed	9.09	9.09	1.00

Leadership

	White	Winthrop	Zed
White	1.00	2.00	0.50
Winthrop	0.50	1.00	0.30
Zed	2.00	3.33	1.00

PCM for Goal

	Intel	Military	Leader.
Intel	1.00	0.70	1.50
Military	1.43	1.00	2.00
Leader	0.67	0.50	1.00

Noble's PCM

	Diplomacy	Economics	Military
Diplomacy	1.00	2.00	1.50
Economics	0.50	1.00	1.30
Military	0.67	0.77	1.00