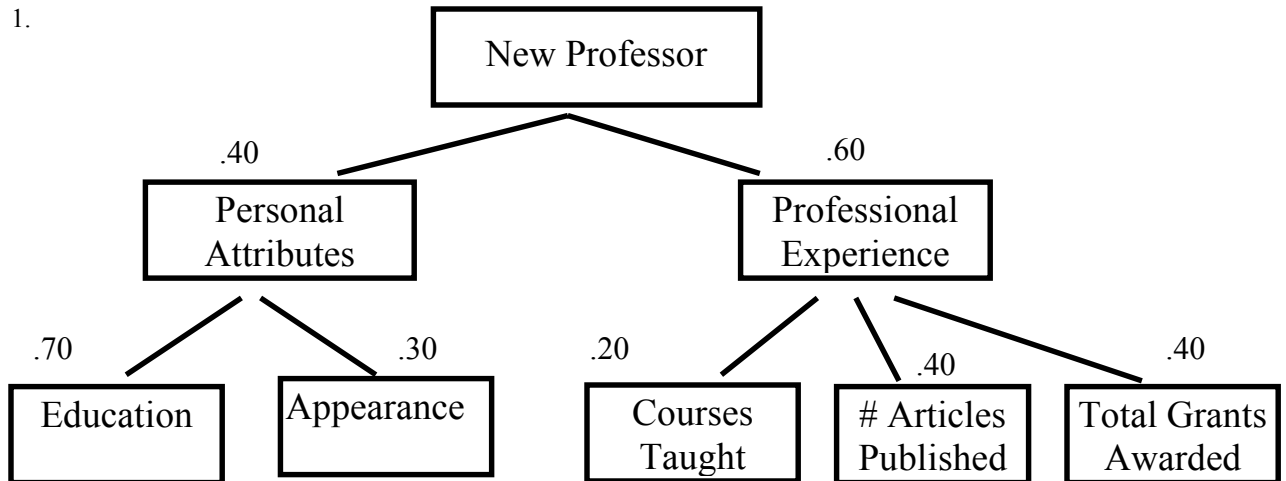


Homework - Decision Analysis Part 1

1.



The above decision tree (hierarchy) was constructed to help decide which, among several candidates, should be hired in a tenure track teaching position that will start next fall. The weights were decided upon by the faculty search committee. Note that the criteria under Personal Attributes are subjective and the rest can easily be quantified. To deal with this subjectivity, the committee has decided to rate the university at which the candidate got his or her doctorate as either a top, middle, or bottom tier school, which are given the rating 3, 2, or 1 respectively, with higher as better. Appearance is scored as slob, adequate, or spiffy, which are given the rating 3, 2, or 1, respectively, with higher as better (snappy dressers are not appreciated at universities). The following table gives the ratings of each applicant with respect to the above criteria.

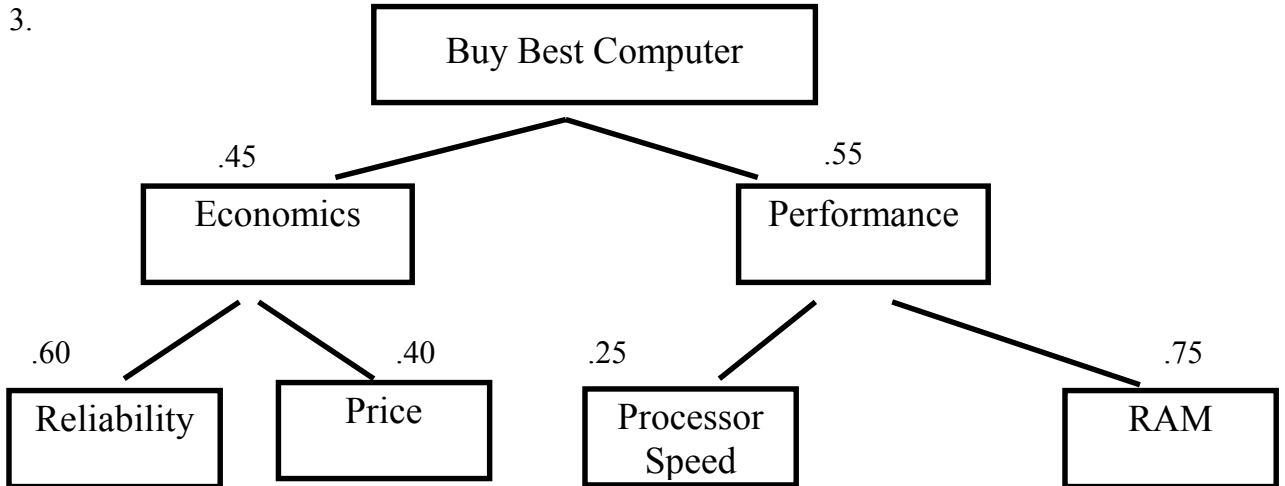
Candidate	Education	Appearance	Courses Taught	# Articles Published	Total Grants Awarded
1	Top	Slob	5	10	25,000
2	Middle	Spiffy	10	0	100,000
3	Bottom	Adequate	0	20	30,000

- (a) Compute the scores for the candidates using the above information.
- (b) Compute the weights associated with the bottom row of hierarchy.

2. When the full faculty looked at the actual weights used to make the committee recommendation, they decided that the hierarchy should not be used, and that an additive value function should be used instead. They accepted the bottom row criteria, but decided to use swing weights. They started by considering the worst possible candidate (not one of the ones shown in problem 1) who possessed the worst rating in each

attribute. They agreed that this candidate would be improved most by swinging the rating on # Articles Published. Next they decided that swinging the rating on Total Grants would be the next best, but only 90% as good as # Articles Published. Next came Education at 50% of # Articles Published, followed by Courses Taught at 30% of # Articles Published, and appearance at 10% of # Articles Published.

Compute the swing weights for the criteria using the above information.



The above decision tree (hierarchy) was constructed to help decide which, among several types of computers, should be purchased. The weights were decided upon by the prospective buyer who was looking for a new computer. Note that all the criteria are objective and can easily be quantified except reliability which has been rated by an expert on a scale from 1 to 10, with 1 being very reliable and 10 being very unreliable. The following table gives the ratings of each alternative computer with respect to the above criteria.

Computer	Reliability	Price	Processor Speed	RAM
1	3	\$1500	120 MHz	16 MB
2	2	\$2300	132 MHz	8 MB
3	5	\$2900	220 MHz	32 MB

- Compute the scores for the candidates using the above information.
- Compute the weights associated with the bottom row of hierarchy.

4. When the computer buyer looked at the actual weights used to make the decision, he decided that the hierarchy should not be used, and that an additive value function should be used instead. He accepted the bottom row criteria, but decided to use swing weights. He started by considering the worst possible computer (not one of the ones shown in

problem 7) which possessed the worst rating in each attribute. He decided that this computer would be improved most by swinging the rating on processor speed. Next he decided that swinging the rating on price would be the next best, but only 90% as good as processor speed. Next came reliability at 50% of processor speed, followed by RAM at 30% of processor speed.

Compute the swing weights for the criteria using the above information.