Quantitative Reasoning 26:

Decisions, Games, and Negotiation

Behavioral Bias Survey (from 2/28/2003)

(1) Estimate the probability that two people in this class celebrate the same birthday: ___

(2) Write down the probability you feel is represented by each phrase:

___a. Chances are better than even that
___b. A possibility exists that
___c. has a high likelihood of occurring
___d. The probability is very high that
___e. It is very unlikely that
___f. There is a slight chance that
___g. The chances are better than even
___h. There is no serious probability that
___i. is probable.
___j. is unlikely
___k. There is a good chance that...
___l. is quite likely.
___m. is improbable.
___n. has a high probability.
___o. There is a chance that
___p. is very improbable.
___q. is likely.

(3) Pia is thirty-one years old, single, outspoken, and smart. She was a philosophy major. When a student she was an ardent supporter of Native American rights, and she picketed a department store that had no facilities for nursing mothers. Rank the following statements in order of probability from 1 (most probable) to 6 (least probable). Ties are allowed. [T&K in H]

___a. Pia is an active feminist.
___b. Pia is a bank teller.
___c. Pia works in a small bookstore.
___d. Pia is a bank teller and an active feminist.
___e. Pia is a bank teller and an active feminist who takes yoga classes.
___f. Pia works in a small bookstore, and is an active feminist who takes yoga classes.

(4) Mark is finishing his MBA at a prestigious university. He is very interested in the arts and at one time considered a career as a musician. Is he more likely to take a job:

___ a. in the management of the arts?  ___ b. in a management consulting firm?
(5) A fair coin is given independent tosses. Order the following sequences of outcomes according to their probability from 1st as most probable, 2nd as the next, with ties allowed. After seeing the first six outcomes, would you be willing to bet $1,000 on the seventh? If so, write down in the blank whether you would bet heads or tails.

___ a. H T H T T H ___
___ b. H H H H T H ___
___ c. H H H T T T ___
___ d. H T H T H T ___

[Optional: Write down on the back a sequence of 50 H’s and T’s that you think look typical of the list of outcomes you could actually get from independent flips of a fair coin.]

(6) Suppose a fair coin is given 10,000 independent flips. If you keep track as you go along of the total number of heads or tails up to that point, estimate the probability that one of these totals will be in the lead at each of over 9,930 tosses, while the other side is in the lead for fewer than 70 of the tosses. ____

(7) For each of the following 10 items, choose upper and lower estimates such that you are 90% sure that the actual value falls between your estimates. Your challenge is to be neither too narrow (overconfident) nor too wide (under confident).

<table>
<thead>
<tr>
<th>Item</th>
<th>.05 Fractile (Low Guess)</th>
<th>.95 Fractile (High Guess)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Martin Luther King’s age at death</td>
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<tr>
<td>2</td>
<td>Length of the Nile River</td>
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<tr>
<td>3</td>
<td>Number of OPEC members</td>
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<tr>
<td>4</td>
<td>Number of Books in the Old Testament</td>
<td></td>
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<tr>
<td>5</td>
<td>Diameter of the moon</td>
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<tr>
<td>6</td>
<td>Weight of an empty Boeing 747</td>
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<tr>
<td>7</td>
<td>Year of Wolfgang Amadeus Mozart’s birth</td>
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<tr>
<td>8</td>
<td>Gestation period of an Asian elephant</td>
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<td>9</td>
<td>Air distance from London to Tokyo</td>
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<tr>
<td>10</td>
<td>Depth of deepest known point in the oceans</td>
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