**Case Problem**

B URLINGHAM T EXTILE C OMPANY

Brenda Last is the personnel director at the Burlingham Textile Company. The company's plant is expanding, and Brenda must fill five new supervisory positions in carding, spinning, weaving, inspection, and shipping. Applicants for the positions are required to take a written psychological and aptitude test. The test has different modules that indicate an applicant 's aptitude and suitability for a specific area and position. For example, one module tests the psychological traits and intellectual skills that are best suited for the inspection department, which are different from the traits and skills required in shipping. Brenda has had 10 applicants for the five positions and has compiled the results from the test. The test scores for each position module for each applicant (where the higher the score, the better) are as follows :

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|  | **Test Module Scores** | | | | |
| --- | --- | --- | --- | --- | --- |
| Applicant | Carding | Spinning | Weaving | Inspection | Shipping |
| Roger Acuff | 68 | 75 | 72 | 86 | 78 |
| Melissa Ball | 73 | 82 | 66 | 78 | 85 |
| Angela Coe | 92 | 101 | 90 | 79 | 74 |
| Maureen Davis | 87 | 98 | 75 | 90 | 92 |
| Fred Evans | 58 | 62 | 93 | 81 | 75 |
| Bob Frank | 93 | 79 | 94 | 92 | 96 |
| Ellen Gantry | 77 | 92 | 90 | 81 | 93 |
| David Harper | 79 | 66 | 90 | 85 | 86 |
| Mary Inchavelia | 91 | 102 | 95 | 90 | 88 |
| Marilu Jones | 72 | 75 | 67 | 93 | 93 |

Brenda wants to offer the vacant positions to the five most qualified candidates. Determine an optimal assignment for Brenda.

There is a possibility that one or more of the successful applicants will turn down a position offer, and Brenda wants to be able to hire the next-best person into a position if someone rejects a job offer. If the applicant selected for the carding job turns it down, whom should Brenda offer this job to next? If the applicants for both the carding and spinning jobs turn them down, which of the remaining applicants should Brenda offer each job to? How would a third applicant be selected if three of the job offers were declined?

Brenda believes this is a particularly good group of applicants. She would like to retain a few of the people for several more supervisory positions that she believes will open up soon. She has two vacant clerical positions that she can offer to the two best applicants not selected for the five original supervisory positions. Then when the supervisory positions open , she can move these people into them.

QUESTIONS?

1. Formulate a linear programming model for this problem.
   1. List the objective function (minimize or maximize) and all model constraints.
2. Solve problem using MS Excel’s Solver
   1. Hint: Use the “integer” constraint
3. This question is an assignment *maximization* problem (hint). However, the Assignment Model could be used to *minimize*. In what circumstances would you (or could you) use the Assignment Model to *minimize*? Give an example.