Another Simulation Model: Hiring Translators

Lingua Translations Company wants to determine how many part-time Hungarian translators it should hire. Examining its records for the last few years, the firm discovers that the number of translation orders per day has followed the following pattern:

Demand Level	Historical Frequency
0	1%
1	2%
2	5%
3	5%
4	7%
5	8%
6	9%
7	11%
8	13%
9	13%
10	9%
11	9%
12	5%
13	1%
14	1%
15	1%

Each translator can process one order a day. Lingua pays a fixed amount of $10 per day to each translator, whether or not the translator has to fill an order. Furthermore, a translator gets $50 for translating an order. If the company receives more orders than it has translators, it asks the translators whether they are available for overtime. For each translator, the chance of being available for overtime is 35%, independent of all other translators and the number of translation orders received. A translator available for overtime can process one additional order, but at a cost of $75. The company charges its customers $95 per translation order.

Assume that the historical demand pattern will continue. In order to maximize its average daily profits, how many translators should Lingua keep on staff? At this staffing level, what is the average number of translation orders per day that Lingua must refuse for lack of staff?

Experiment with 5, 6, 7, ... , 12 translators with a sample size of 1,000.