6. (15 pts) K-Corp is considering buying one of three new CNC Mills. The return in profits is a function of the initial cost of the machine and the actual sales generated. The payoff matrix is given below.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Low Sales</th>
<th>Med. Sales</th>
<th>High Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mill 1</td>
<td>50,000</td>
<td>65,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Mill 2</td>
<td>45,000</td>
<td>60,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Mill 3</td>
<td>40,000</td>
<td>55,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Prob</td>
<td>0.2</td>
<td>0.5</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Determine which machine to purchase using

a. (5) MiniMax criteria

\[ \text{Find highest payoff for each, take lowest.} \]

=> Choose Mill 1

b. (5) Baye’s Decision Rule

\[
\begin{align*}
E[M_1] &= 0.2(50,000) + 0.5(65,000) + 0.3(70,000) = 63,000 \\
E[M_2] &= 0.2(45,000) + 0.5(60,000) + 0.3(75,000) = 61,500 \\
E[M_3] &= 0.2(40,000) + 0.5(55,000) + 0.3(80,000) = 59,500 \\
\end{align*}
\]

\[ E[M_1] > E[M_2] > E[M_3] \]

=> Choose Mill 1

c. (5) Aspiration Level (aspiration = $65,000)

\[
\begin{align*}
\text{Find max prob \ such \ that \ payoff} & \geq 65,000 \\
\Phi^5 P_{M_1} & \geq 65,000 = 0.5 + 0.3 = 0.8 \\
\Phi^5 P_{M_2} & \geq 65,000 = 0.3 \\
\Phi^5 P_{M_3} & \geq 65,000 = 0.3 \\
\end{align*}
\]

=> Choose Mill 1