Solution to April 16 Finance 331 Homework

The portfolio weights to use for each stock are as follows:

- A: 50%
- B: 25%
- C: 25%

<table>
<thead>
<tr>
<th>State of Economy</th>
<th>Probability of State of Economy</th>
<th>Portfolio Return if State Occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boom</td>
<td>.40</td>
<td>.50(10%) + .25(15%) + .25(20%) = 13.75%</td>
</tr>
<tr>
<td>Bust</td>
<td>.60</td>
<td>.50(8%) + .25(4%) + .25(0%) = 5.00%</td>
</tr>
</tbody>
</table>

There are two ways to calculate the expected return on the portfolio.

1. Find the expected return of each stock** and use the following formula:
   \[ E(R_p) = \sum x_i E(R_i) = .50(8.8\%) + .25(8.4\%) + .25(8.0\%) = 8.5\% \]

   **Expected return for each stock:
   \[ E(R_A) = .40(10\%) + .60(8\%) = 8.8\% \]
   \[ E(R_B) = .40(15\%) + .60(4\%) = 8.4\% \]
   \[ E(R_C) = .40(20\%) + .60(0\%) = 8.0\% \]
   
or

2. Using the portfolio returns if state occurs and the associated probabilities:
   \[ E(R_p) = .40(13.75\%) + .60(5.0\%) = 8.5\% \]

To get Std(R), first calculate Var(R) the take the square root:

\[ \text{Var}(R) = .4(.1375 - .085)^2 + .6(.05 - .085)^2 = 0.0011 + 0.0007 = 0.0018 \]

\[ \text{Std}(R) = \sqrt{\text{Var}(R)} = \sqrt{0.0018} = .0429 \quad 4.29\% \]