1.2. A morning newspaper lists the following used-car prices for a foreign compact with age
\( x_1 \) measured in years and selling price \( x_2 \) measured in thousands of dollars:

\[
\begin{array}{ccccccccccc}
    x_1 & 1 & 2 & 3 & 4 & 5 & 6 & 8 & 9 & 11 \\
 x_2 & 18.95 & 19.00 & 17.95 & 15.54 & 14.00 & 12.95 & 8.94 & 7.49 & 6.00 & 3.99 \\
\end{array}
\]

(a) Construct a scatter plot of the data and marginal dot diagrams.
(b) Infer the sign of the sample covariance \( s_{12} \) from the scatter plot.
(c) Compute the sample means \( \bar{x}_1 \) and \( \bar{x}_2 \) and the sample variances \( s_{11} \) and \( s_{22} \). Compute the sample covariance \( s_{12} \) and the sample correlation coefficient \( r_{12} \). Interpret these quantities.
(d) Display the sample mean array \( \bar{x} \), the sample variance-covariance array \( S_n \), and the sample correlation array \( R \) using (1-8).

1.3. The following are five measurements on the variables \( x_1, x_2, \) and \( x_3 \):

\[
\begin{array}{cccc}
    x_1 & 9 & 2 & 6 \\
 x_2 & 2 & 6 & 5 & 8 \\
 x_3 & 3 & 4 & 0 & 2 & 1 \\
\end{array}
\]

Find the arrays \( \bar{x}, S_n, \) and \( R \).  

1.4. The world’s 10 largest companies yield the following data:

<table>
<thead>
<tr>
<th>Company</th>
<th>( x_1 ) = sales (billions)</th>
<th>( x_2 ) = profits (billions)</th>
<th>( x_3 ) = assets (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citigroup</td>
<td>108.28</td>
<td>17.05</td>
<td>1,484.10</td>
</tr>
<tr>
<td>General Electric</td>
<td>152.36</td>
<td>16.59</td>
<td>750.33</td>
</tr>
<tr>
<td>American Intl Group</td>
<td>95.04</td>
<td>10.91</td>
<td>766.42</td>
</tr>
<tr>
<td>Bank of America</td>
<td>65.45</td>
<td>14.14</td>
<td>1,110.46</td>
</tr>
<tr>
<td>HSBC Group</td>
<td>62.97</td>
<td>9.52</td>
<td>1,031.29</td>
</tr>
<tr>
<td>ExxonMobil</td>
<td>263.99</td>
<td>25.33</td>
<td>195.26</td>
</tr>
<tr>
<td>Royal Dutch/Shell</td>
<td>265.19</td>
<td>18.54</td>
<td>193.83</td>
</tr>
<tr>
<td>BP</td>
<td>285.06</td>
<td>15.73</td>
<td>191.11</td>
</tr>
<tr>
<td>ING Group</td>
<td>92.01</td>
<td>8.10</td>
<td>1,175.16</td>
</tr>
<tr>
<td>Toyota Motor</td>
<td>165.68</td>
<td>11.13</td>
<td>211.15</td>
</tr>
</tbody>
</table>


(a) Plot the scatter diagram and marginal dot diagrams for variables \( x_1 \) and \( x_2 \). Comment on the appearance of the diagrams.
(b) Compute \( \bar{x}_1, \bar{x}_2, s_{11}, s_{22}, s_{12}, \) and \( r_{12} \). Interpret \( r_{12} \).

1.5. Use the data in Exercise 1.4.
(a) Plot the scatter diagrams and dot diagrams for \( (x_2, x_3) \) and \( (x_1, x_3) \). Comment on the patterns.
(b) Compute the \( \bar{x}, S_n, \) and \( R \) arrays for \( (x_1, x_2, x_3) \).