Problem 2 (20 points)
Results of a laboratory analysis of calories content of major hot dog brands are given below. Researchers for Consumer Reports analyzed three types of hot dog: beef, poultry, and meat (mostly pork and beef, but up to 15% poultry meat). The data are summarized in the table below:

<table>
<thead>
<tr>
<th>Type</th>
<th>n_i</th>
<th>\bar{y}_i</th>
<th>s_i^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>20</td>
<td>156.85</td>
<td>512.66</td>
</tr>
<tr>
<td>Poultry</td>
<td>17</td>
<td>118.76</td>
<td>508.57</td>
</tr>
<tr>
<td>Meat</td>
<td>17</td>
<td>158.71</td>
<td>636.85</td>
</tr>
</tbody>
</table>


Construct the ANOVA table and test the hypothesis that the mean calories content for the three types of hot dogs are equal against the alternative that at least two are not equal. Use \( \alpha = 0.05 \).

Please use this space for your calculations:

\[
BSS = 20(156.85-145.44)^2 + 17(118.76-145.44)^2 + 17(158.71-145.44)^2
\]

\[
BSS = 17698.52
\]

\[
WSS = (n_1-1)s_1^2 + (n_2-1)s_2^2 + (n_3-1)s_3^2
\]

\[
= 19(572.66) + 16(508.57) + 16(636.85) = 28067.26
\]

Bonferroni: \( x_i - x_j \leq t_{\alpha/6} \sqrt{\frac{\text{SSE}}{n_i+n_j-2}} \)

\[
156.85 - 118.76 \leq 2.09 \sqrt{\frac{28067.26}{19+16+16}}
\]

\[
38.09 + 19.56 \quad 18.57 \quad \frac{38.09 - 19.56}{5.765}
\]

Complete the ANOVA table:

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>2</td>
<td>17698.52</td>
<td>8849.16</td>
<td>16.09</td>
</tr>
<tr>
<td>Within</td>
<td>51</td>
<td>28067.26</td>
<td>550.04</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>45765.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\eta = 0.05
\]

\[
\frac{0.05}{3}
\]