Background:
In this assignment, you will utilize:

- Conditional Blocks
- Functions
- Arrays
- For Loops

Description:
In this assignment, you will compute statistics for a set of grades. These grades will be input by the user and stored into an array.

Please Note: Open all input files with notepad++. Windows notepad will NOT properly display the input file.

Formulae:

\[ Variance = E[X^2] - E[X]^2 = \text{Average of Squares} - \text{Average Squared} \]

\[ Standard\ Deviation = \sqrt{Variance} \]

Instructions:

- **Preliminary Instructions**
  1. Read this prompt completely before modifying the template.
  2. Read the provided template—including all comments.
  3. Make use of the provided variables.
  4. You may declare additional variables as needed.
    - All additional variables must be documented.

- **Function**: determineLetterGrade
  1. As an exercise, you are restricted to exactly one return statement.
  2. This function takes a numerical grade and returns the corresponding letter grade.
  3. Complete this function by creating a conditional block:
    - If 90 <= to_classify <= 100: A
    - If 80 <= to_classify < 90: B
    - If 70 <= to_classify < 80: C
    - If 60 <= to_classify < 70: D
    - If to_classify < 60: F
  4. **Hint**: The provided conditions cannot be used as provided.
  5. **Hint**: Use an if-else-if conditional block.

- **Function**: main
  1. **Familiarize yourself with the provided for loop.**
  2. Complete the grade prompt—i.e., “Enter grade #”
    - Write a cin statement to store the grade in the i-th position of the array.
  3. Add the appropriate conditional block to find the minimum grade.
  4. Add the appropriate conditional block to find the maximum grade.
  5. Add statements to compute the running sum.
6. Add statements to compute the sum of the squares of all grades.
   • E.g., \(100^2 + 98.32^2 + 83.45^2\)
7. Steps 2 through 6 must be completed within the same while loop.
8. Compute all grade statistics:
   • Average
   • Variance
   • Standard Deviation
9. Print the all grades contained within the array.
   • Hint: You will need a for loop—similar to the provided loop.
   • Print the grade number, numerical grade, and letter grade.
   • You will need to invoke the determineLetterGrade function for each element.
   • Use setw, left and right to format the output.
   • See the sample output for an example
10. Print the grade statistics.
    • Minimum Grade
    • Maximum Grade
    • Average Grade
    • Variance
    • Standard Deviation

   **Reflection**
   1. Reread all comments.
   2. Add additional comments where appropriate.

Sample Output:

```
How many grades will be entered?: 8
Enter grade # 1: 100
Enter grade # 2: 98.74
Enter grade # 3: 32.49
Enter grade # 4: 100
Enter grade # 5: 98
Enter grade # 6: 86
Enter grade # 7: 100
Enter grade # 8: 100

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Grade Listing
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<table>
<thead>
<tr>
<th>Grade #</th>
<th>Score</th>
<th>Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100.00</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>98.74</td>
<td>A</td>
</tr>
<tr>
<td>3</td>
<td>32.49</td>
<td>F</td>
</tr>
<tr>
<td>4</td>
<td>100.00</td>
<td>A</td>
</tr>
<tr>
<td>5</td>
<td>98.00</td>
<td>A</td>
</tr>
<tr>
<td>6</td>
<td>86.00</td>
<td>B</td>
</tr>
<tr>
<td>7</td>
<td>100.00</td>
<td>A</td>
</tr>
<tr>
<td>8</td>
<td>100.00</td>
<td>A</td>
</tr>
</tbody>
</table>

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Grade Summary
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Minimum : 32.49
Maximum : 100.00
Average  : 89.40
Variance : 482.62
Std. Dev. : 21.97
```