Solution to Problem 19

**Task.** As described in the corresponding lecture, every grammar obtained from a finite automaton is LL(1). For the grammar from Homework 8, build the corresponding table.

**Solution.** This grammar has three variables $S$, $N$, and $E$, three terminal symbols $A$, $a$, and $1$, and the following rules:

1. $S \rightarrow AN$
2. $S \rightarrow aE$
3. $S \rightarrow 1E$
4. $N \rightarrow AE$
5. $N \rightarrow aN$
6. $N \rightarrow 1E$
7. $E \rightarrow AE$
8. $E \rightarrow aE$
9. $E \rightarrow 1E$
10. $N \rightarrow \varepsilon$.

So, the corresponding table has the following form:

<table>
<thead>
<tr>
<th></th>
<th>$A$</th>
<th>$a$</th>
<th>1</th>
<th>eol</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S$</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>$N$</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>$E$</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>