Solution to Problem 18

**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 $S$, $C$, and $E$, three terminal symbols 0, 1, and $a$, and the following rules:

1. $S \rightarrow AC$
2. $S \rightarrow 0E$
3. $S \rightarrow 1E$
4. $S \rightarrow aE$
5. $C \rightarrow AC$
6. $C \rightarrow aC$
7. $C \rightarrow 0C$
8. $C \rightarrow 1C$
9. $E \rightarrow AE$
10. $E \rightarrow aE$
11. $E \rightarrow 0E$
12. $E \rightarrow 1E$
13. $C \rightarrow \varepsilon$

So, the corresponding table has the following form:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>$a$</th>
<th>$A$</th>
<th>col</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S$</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>$C$</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>$E$</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>9</td>
<td>–</td>
</tr>
</tbody>
</table>