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 $S$, $N$, and $R$, three terminal symbols $a$, $r$, and $A$, and the following rules:

1. $S \rightarrow rR$
2. $S \rightarrow aN$
3. $S \rightarrow AN$
4. $N \rightarrow rR$
5. $N \rightarrow aN$
6. $N \rightarrow AN$
7. $R \rightarrow rR$
8. $R \rightarrow aR$
9. $R \rightarrow AR$
10. $N \rightarrow \varepsilon$

So, the corresponding table has the following form:

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