**CS606 Assignment #2 Spring 2023**

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**Question:**

Consider the following canonical collection of LR(1) items for a typical grammar;

|  |  |  |
| --- | --- | --- |
| Goto | State | Closure |
|  | 0 | {  [S → •A, $]  [A → •B C D E, $]  [B → •C D E, e]  [C → •D E, e]  [D → •E, e]  [E → •e, e]  } |
| goto(0, A) | 1 | {  [S → A•, $]  } |
| goto(0, B) | 2 | {  [A → B•C D E, $]  [C → •D E, e]  [D → •E, e]  [E → •e, e]  } |
| goto(0, C) | 3 | {  [B → C•D E, e]  [D → •E, e]  [E → •e, e]  } |
| goto(0, D) | 4 | {  [C → D•E, e]  [E → •e, e]  } |
| goto(0, E) | 5 | {  [D → E•, e]  } |
| goto(0, e) | 6 | {  [E → e•, e]  } |
| goto(2, C) | 7 | {  [A → B C•D E, $]  [D → •E, e]  [E → •e, e]  } |
| goto(2, D) | 4 |  |
| goto(2, E) | 5 |  |
| goto(2, e) | 6 |  |
| goto(3, D) | 8 | {  [B → C D•E, e]  [E → •e, e]  } |
| goto(3, E) | 5 |  |
| goto(3, e) | 6 |  |
| goto(4, E) | 9 | {  [C → D E•, e]  } |
| goto(4, e) | 6 |  |
| goto(7, D) | 10 | {  [A → B C D•E, $]  [E → •e, $]  } |
| goto(7, E) | 5 |  |
| goto(7, e) | 6 |  |
| goto(8, E) | 11 | {  [B → C D E•, e]  } |
| goto(8, e) | 6 |  |
| goto(10, E) | 12 | {  [A → B C D E•, $]  } |
| goto(10, e) | 13 | {  [E → e•, $]  } |

You are required to generate CLR(1) parsing table:

**Solution:**

The required CLR(1) parsing table is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Action** | | **Goto** | | | | |
| **e** | **$** | **A** | **B** | **C** | **D** | **E** |
| **0** | 6 |  | 1 | 2 | 3 | 4 | 5 |
| **1** |  | accept |  |  |  |  |  |
| **2** | 6 |  |  |  | 7 | 4 | 5 |
| **3** | 6 |  |  |  |  | 8 | 5 |
| **4** | 6 |  |  |  |  |  | 9 |
| **5** |  |  |  |  |  |  |  |
| **6** |  |  |  |  |  |  |  |
| **7** | 6 |  |  |  |  | 10 | 5 |
| **8** | 6 |  |  |  |  |  | 11 |
| **9** |  |  |  |  |  |  |  |
| **10** | 13 |  |  |  |  |  | 12 |
| **11** |  |  |  |  |  |  |  |
| **12** |  |  |  |  |  |  |  |
| **13** |  |  |  |  |  |  |  |