上下文无关文法：

1. S -> **int main ( ) {** Code\_block **}**
2. Code\_block -> Conditional\_branch Code\_block
3. Code\_block -> Loop\_statement Code\_block
4. Code\_block -> Variable\_declaration Code\_block
5. Code\_block -> Assignment Code\_block
6. Code\_block -> ***e***
7. Conditional\_branch -> **if (** Comparison\_statement **) {** Code\_block **} else {** Code\_block **}**
8. Conditional\_branch -> **if (** Comparison\_statement **) {** Code\_block **}**
9. Loop\_statement -> **while (** Comparison\_statement **) {** Code\_block **}**
10. Comparison\_statement -> **id comparison id**
11. Comparison\_statement -> **id comparison num**
12. Comparison\_statement -> **num comparison num**
13. Variable\_declaration -> **int id =** E **;**
14. Variable\_declaration -> **double id =** E **;**
15. Assignment -> **id** = E **;**
16. E -> E **+** T
17. E -> T
18. T -> T **\*** F
19. T -> F
20. F -> ( **E** )
21. F -> **id**
22. F -> **num**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | Action | | | | | | Goto | | |
| id | ( | ) | + | \* | $ | E | T | F |
| 0 | S5 | S4 |  |  |  |  | 1 | 2 | 3 |
| 1 |  |  |  | S6 |  | acc |  |  |  |
| 2 |  |  | R2 | R2 | S7 | R2 |  |  |  |
| 3 |  |  | R4 | R4 | R4 | R4 |  |  |  |
| 4 | S5 | S4 |  |  |  |  | 8 | 2 | 3 |
| 5 |  |  | R6 | R6 | R6 | R6 |  |  |  |
| 6 | S5 | S4 |  |  |  |  |  | 9 | 3 |
| 7 | S5 | S4 |  |  |  |  |  |  | 10 |
| 8 |  |  | S11 | S6 |  |  |  |  |  |
| 9 |  |  | R1 | R1 | S7 | R1 |  |  |  |
| 10 |  |  | R3 | R3 | R3r | R3 |  |  |  |
| 11 |  |  | R5 | R5 | R5 | R5 |  |  |  |