

## Problem 1

Camel: ([ A- Z] [a-z]\*)+

Snake:[a-z]+( " " [a-z]+)\*

1.1 Camel | Snake

1.2 [A-Z a-e g-k m-z] [a-zA-Z0-9" "]\*

| f [a-m o-z A-Z0-9" " ] [a-z A-Z0-9" "]\*| fn [a-z A-Z0-9" "]+ | f

| l [a-d f-z A-Z0-9" " ] [a-z A-Z0-9" "]\* | le [a-s u-z A-Z0-9" " ] [a-z A-Z0-9" "]\* | let[A-Za-z0-9" "]+ | l | le

Numeric: [1-9]+[0-9]\*

String: "" [a-z A-Z0-9" " . " ] \* ""

1.3 Numeric | String

2. Output1:

Begin Rust:

FunctionName:compiler\_mid\_quiz

begin Function

Next:

end Function

Output2:

Begin Rust:

Invalid FunctionName

Output3:

Begin Rust:

FunctionName:compilerexam

Next:

begin Function

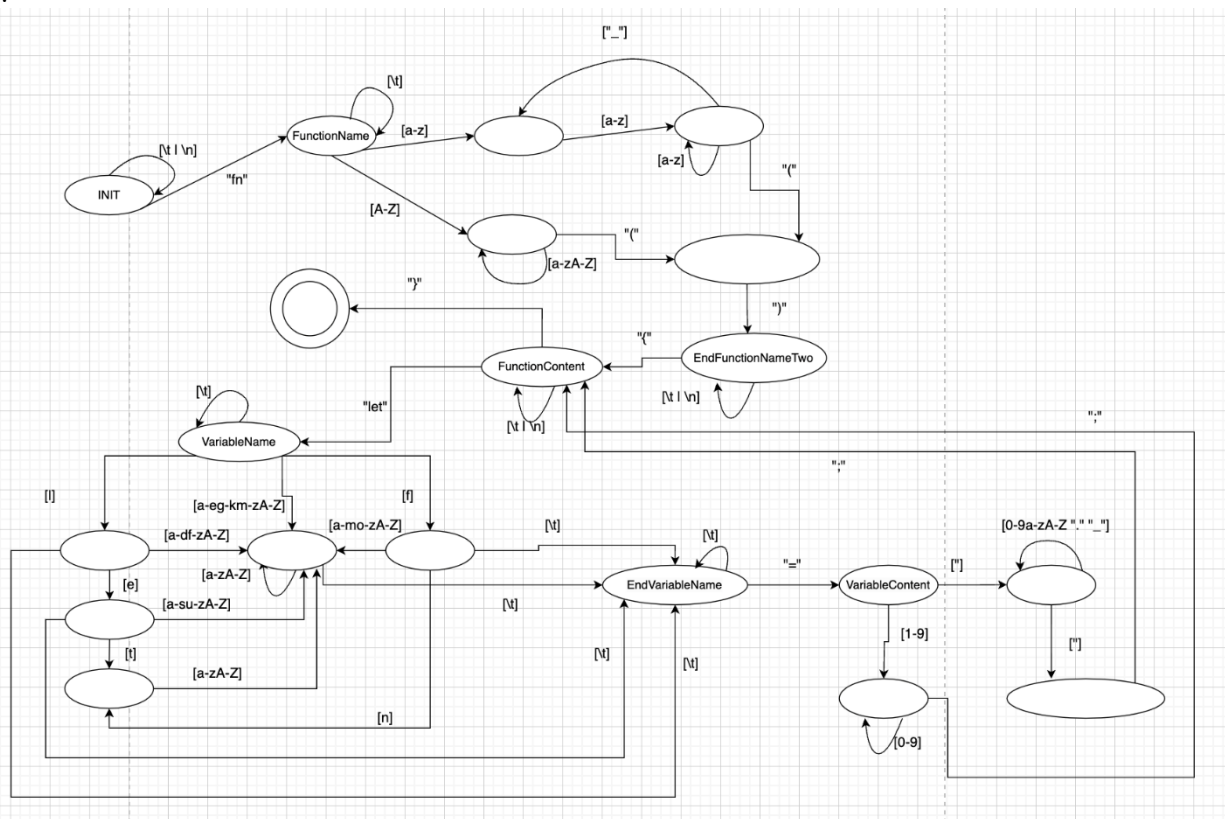
Next:

begin variable define

VariableName: midQuiz

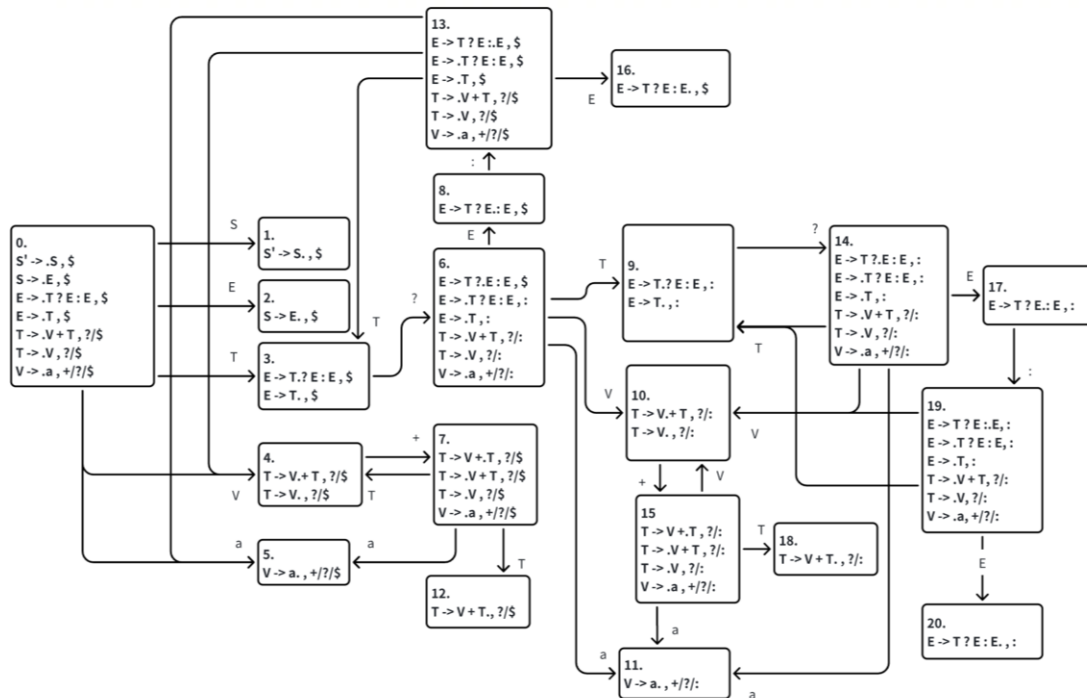
Invalid VariableContent

3.



## Problem 2

- It's an LR(1) grammar.



- No conflict.

|    | ?   | :   | +   | a   | \$  | S | E  | T  | V  |
|----|-----|-----|-----|-----|-----|---|----|----|----|
| 0  |     |     |     | s5  |     | 1 | 2  | 3  | 4  |
| 1  |     |     |     |     | acc |   |    |    |    |
| 2  |     |     |     |     | r1  |   |    |    |    |
| 3  | s6  |     |     |     | r3  |   |    |    |    |
| 4  | r5  |     | s7  |     | r5  |   |    |    |    |
| 5  | r6  |     | r6  |     | r6  |   |    |    |    |
| 6  |     |     |     | s11 |     |   | 8  | 9  | 10 |
| 7  |     |     |     | s5  |     |   |    | 12 | 4  |
| 8  |     | s13 |     |     |     |   |    |    |    |
| 9  | s14 | r3  |     |     |     |   |    |    |    |
| 10 | r5  | r5  | s15 |     |     |   |    |    |    |
| 11 | r6  | r6  | r6  |     |     |   |    |    |    |
| 12 | r4  |     |     |     | r4  |   |    |    |    |
| 13 |     |     |     | s5  |     |   | 16 | 3  | 4  |
| 14 |     |     |     | s11 |     |   | 17 | 9  | 10 |
| 15 |     |     |     | s11 |     |   |    | 18 | 10 |
| 16 |     |     |     |     | r2  |   |    |    |    |
| 17 |     | s19 |     |     |     |   |    |    |    |
| 18 | r4  | r4  |     |     |     |   |    |    |    |
| 19 |     |     |     | s11 |     |   | 20 | 9  | 10 |
| 20 |     | r2  |     |     |     |   |    |    |    |

3.

| Step | Stack                    | Action |
|------|--------------------------|--------|
| 1    | 0                        | s5     |
| 2    | 0 a 5                    | r6     |
| 3    | 0 V                      | 4      |
| 4    | 0 V 4                    | r5     |
| 5    | 0 T                      | 3      |
| 6    | 0 T 3                    | s6     |
| 7    | 0 T 3 ? 6                | s11    |
| 8    | 0 T 3 ? 6 a 11           | r6     |
| 9    | 0 T 3 ? 6 V              | 10     |
| 10   | 0 T 3 ? 6 V 10           | s15    |
| 11   | 0 T 3 ? 6 V 10 + 15      | s11    |
| 12   | 0 T 3 ? 6 V 10 + 15 a 11 | r6     |
| 13   | 0 T 3 ? 6 V 10 + 15 V    | 10     |
| 14   | 0 T 3 ? 6 V 10 + 15 V 10 | r5     |
| 15   | 0 T 3 ? 6 V 10 + 15 T    | 18     |
| 16   | 0 T 3 ? 6 V 10 + 15 T 18 | r4     |
| 17   | 0 T 3 ? 6 T              | 9      |
| 18   | 0 T 3 ? 6 T 9            | r3     |
| 19   | 0 T 3 ? 6 E              | 8      |
| 20   | 0 T 3 ? 6 E 8            | s13    |
| 21   | 0 T 3 ? 6 E 8 : 13       | s5     |
| 22   | 0 T 3 ? 6 E 8 : 13 a 5   | r6     |
| 23   | 0 T 3 ? 6 E 8 : 13 V     | 4      |
| 24   | 0 T 3 ? 6 E 8 : 13 V 4   | r5     |
| 25   | 0 T 3 ? 6 E 8 : 13 T     | 3      |
| 26   | 0 T 3 ? 6 E 8 : 13 T 3   | r3     |
| 27   | 0 T 3 ? 6 E 8 : 13 E     | 16     |
| 28   | 0 T 3 ? 6 E 8 : 13 E 16  | r2     |
| 29   | 0 E                      | 2      |
| 30   | 0 E 2                    | r1     |
| 31   | 0 S                      | 1      |
| 32   | 0 S 1                    | acc    |

### Problem 3

1.

$E0 = \{ \text{numA} \rightarrow \text{int}, \text{numB} \rightarrow \text{int}, \text{diff} \rightarrow \text{int} \}$

$E1 = E0 + \{ \text{addRes} \rightarrow \text{int} \}$

$E2 = E1 + \{ x \rightarrow \text{int}, y \rightarrow \text{int}, z \rightarrow \text{int} \}$

$E3 = E2 + \{ \text{flag} \rightarrow \text{int}, \text{tmp} \rightarrow \text{int} \}$

$E4 = E1$

$E5 = E4 + \{ \text{errorMsg} \rightarrow \text{string} \}$

$E6 = E1$

$E7 = E1$

$E8 = E1$

2.

2: E0

5: E2

8-11: E3

15: E1 / E4

20: E5

25: E1/E7

28: E1/E8

29: E1/E8