**Grammar G**

PROGRAM 🡪 BLOCK

BLOCK 🡪 **block** DEFINITIONS; **begin** COMMANDS; **end**

DEFINITIONS 🡪 DEFINITION DEFINITIONS’

DEFINITIONS’ 🡪 ;DEFINITION DEFINITIONS’ | 𝜀

DEFINITION 🡪 VAR\_DEFINITION | TYPE\_DEFINITION

VAR\_DEFINITION 🡪 id : VAR\_DEFINITION’

VAR\_DEFINITION’ 🡪 BASIC\_TYPE | type\_name

TYPE\_DEFINITION 🡪 **type** type\_name **is** TYPE\_INDICATOR

TYPE\_INDICATOR **🡪** BASIC\_TYPE | ARRAY\_TYPE | POINTER\_TYPE

BASIC\_TYPE 🡪 **integer** | **real**

ARRAY\_TYPE 🡪 **array** [SIZE] **of** BASIC\_TYPE

POINTER\_TYPE 🡪 **^** POINTER\_TYPE’

POINTER\_TYPE’ 🡪 BASIC\_TYPE | type\_name

SIZE 🡪 int\_num

COMMANDS 🡪 COMMAND COMMANDS’

COMMANDS’ 🡪 ;COMMAND COMMANDS’ | 𝜀

COMMAND 🡪

id COMMAND’ |

**when** (EXPRESSION rel\_op EXPRESSION)

**do** COMMANDS;

**default** COMMANDS; **end\_when** |

**for** (id = EXPRESSION; id rel\_op EXPRESSION; id++)COMMANDS; **end\_for** |

**free**(id) |

BLOCK

COMMAND’ 🡪 RECEIVER’ = EXPRESSION | = **malloc**(**size\_of**(type\_name))

RECEIVER 🡪 id RECEIVER’

RECEIVER’ 🡪 𝜀 | [EXPRESSION] | ^

EXPRESSION 🡪 id EXPRESSION’ | int\_num | real\_num | &id | **size\_of**(type\_name)

EXPRESSION’ 🡪 RECEIVER’ | ar\_op EXPRESSION

**Variables table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Nullable** | **First** | **Follow** |
| PROGRAM |  | **block** | EOF |
| BLOCK |  | **block** | EOF |
| DEFINITIONS |  | id | **type** | ; |
| DEFINITIONS’ | V | ; | ; |
| DEFINITION |  | id | **type** | ; |
| VAR\_DEFINITION |  | id | ; |
| VAR\_DEFINITION’ |  | **integer** | **real** | type\_name | ; |
| TYPE\_DEFINITION |  | **type** | ; |
| TYPE\_INDICATOR |  | **integer | real | array | ^** | ; |
| BASIC\_TYPE |  | **interger | real** | ; |
| ARRAY\_TYPE |  | **array** | ; |
| POINTER\_TYPE |  | ^ | ; |
| POINTER\_TYPE’ |  | **integer | real** | ; |
| SIZE |  | int\_num | ] |
| COMMANDS |  | id | **when** | **for** | **free** | **block** | ; |
| COMMANDS’ | V | ; | ; |
| COMMAND |  | id | **when** | **for** | **free** | **block** | ; |
| COMMAND’ |  | [ | ^ | = | ; |
| RECEIVER |  | id | = |
| RECEIVER’ | V | [ | ^ | = |
| EXPRESSION |  | id | int\_num | real\_num | & | **size\_of** | ] | ; | rel\_op |
| EXPRESSION’ | V | [ | ^ | ar\_op | ] | ; | rel\_op |