Semantics

**Constant Table**

**Function Directory**

Stores characteristics of each block in the program, must contain starting block. The function directory is represented as a Python Class called Function\_Directory. This Class contains two instance variables representing values for:

* Starting Block Key: String
* Function Reference Table: Python Dictionary
  + <https://www.tutorialspoint.com/python/python_dictionary.htm>
* Constant table: Python Dictionary
* Memory handler: Instance of class

The Function Reference Table, or FRT, stores values for:

* Block name: String
  + String contains name of block assigned in code
* Type block returns: String
  + String contains type of return value if declared so, if not it is default to “void”
* Local Variables: Python Class
  + Class is made up of two python dictionaries:
    - Primitives: a python dictionary that holds data relevant to local variables
    - Lists: A python dictionary that holds data relevant to local arrays
* Parameters: Python List
  + A list containing the type (stored as a code represented by bits) of each parameter stored in the same order that the block receives them.
  + Type codes:
    - Whole - 0b00
    - Decimal - 0b01
    - Words - 0b10
    - Boolean - 0b11
* Return value: Stack
  + Stack contains values that function should return
* Quad Position
  + Contains the position of the starting quadruple of the function

Example of Function Reference Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Key** | **Value (List)** | | | | |
| **Block name** | **Return Type** | **Local Variables** | **Parameters** | **Quad Position** | **Return Value** |
| firstBlock | void | - | - | xxxx | - |
| secondBlock | whole | - | - | xxxx | - |

Example of Primitive Dictionary

Var1, var2 of type whole

|  |  |  |
| --- | --- | --- |
| **Key** | **Value (List)** | |
| **Var Name** | **Type** | **address** |
| Var1 | 0b00 (whole) | xxxx |
| Var2 | 0b00 (whole) | xxxx |

Example of List Dictionary

List1 of type whole size 5

List2 of type words size 10

|  |  |  |  |
| --- | --- | --- | --- |
| **Key** | **Value (List)** | | |
| **Var Name** | **Type** | **address** | **Size** |
| List1 | 0b00 (whole) | xxxx | 5 |
| List2 | 0b10 (words) | xxxx | 10 |

Example of parameter list

block(whole, words, decimal)

|  |  |
| --- | --- |
| **Index** | **Value (Bits)** |
| **Order in block definition** | **Type** |
| 0 | 0b00 (whole) |
| 1 | 0b10 (words) |
| 2 | 0b01 (decimal) |

Example of Constant Table

|  |  |  |
| --- | --- | --- |
| **Key** | **Type** | **address** |
| 5 | 0b00 (whole) | xxxx |
| 5.5 | 0b01 (decimal) | xxxx |