**Predict Set**

|  |  |  |  |
| --- | --- | --- | --- |
| # | Expression | First | Predict |
| 1 | **First** ( <global> Lead : Start <statements> End . <taskdef > ) | **First (**<global>) | Let, Array, Object, Var, Task, Lead |
| 2 | **First** ( <global\_choice> . <global> ) | **First (**<global\_choice>) | Let, Array, Object, Var, Task |
| 3 | (**First** (λ) – λ) **∪ Follow** ( <global> ) | **Follow (**<global>) | Lead |
| 4 | **First** ( <let\_global> ) | **First (**<let\_global>) | Let |
| 5 | **First** ( <vardec> ) | **First (**<vardec>) | Var |
| 6 | **First** ( <array> ) | **First (**<array>) | Array |
| 7 | **First** ( <task> ) | **First (**<task>) | Task |
| 8 | **First** ( <object> ) | **First (**<object>) | Object |
| 9 | **First** ( Int id ) | **First (**Int) | Int |
| 10 | **First** ( Double id ) | **First (**Double) | Double |
| 11 | **First** ( Char id ) | **First (**Char) | Char |
| 12 | **First** ( String id ) | **First (**String) | String |
| 13 | **First** ( Boolean id ) | **First (**Boolean) | Boolean |
| 14 | **First** ( Let id is <values> ) | **First (**Let) | Let |
| 15 | **First** ( intlit ) | **First (**intlit) | intlit |
| 16 | **First** ( doublelit ) | **First (**doublelit) | doublelit |
| 17 | **First** ( stringlit ) | **First (**stringlit) | stringlit |
| 18 | **First** ( charlit ) | **First (**charlit) | charlit |
| 19 | **First** ( boollit ) | **First (**boollit) | boollit |
| 20 | **First** ( Var <vardtype> ) | **First (**Var) | Var |
| 21 | **First** ( Int id <varinitINT><vartailINT> ) | **First (**Int) | Int |
| 22 | **First** ( Double id <varinitDOUBLE><vartailDOUBLE> ) | **First (**Double) | Double |
| 23 | **First** ( Char id <varinitCHAR><vartailCHAR> ) | **First (**Char) | Char |
| 24 | **First** ( String id <varinitSTRING><vartailSTRING> ) | **First (**String) | String |
| 25 | **First** ( Boolean id <varinitBOOLEAN><vartailBOOLEAN> ) | **First (**Boolean) | Boolean |
| 26 | **First** ( is <mathopINT> ) | **First (**is) | is |
| 27 | (**First** (λ) – λ) **∪ Follow** ( <varinitINT> ) | **Follow(**<varinitINT>) | ;, . |
| 28 | **First** ( is <mathopDOUBLE> ) | **First (**is) | is |
| 29 | (**First** (λ) – λ) **∪ Follow** ( <varinitDOUBLE> ) | **Follow(**<varinitDOUBLE>) | ;, . |
| 30 | **First** ( is <valueCHAR> ) | **First (**is) | is |
| 31 | (**First** (λ) – λ) **∪ Follow** ( <varinitCHAR> ) | **Follow(**<varinitCHAR>) | ;, . |
| 32 | **First** ( is <valueSTRING> ) | **First (**is) | is |
| 33 | (**First** (λ) – λ) **∪ Follow** ( <varinitSTRING> ) | **Follow(**<varinitSTRING>) | ;, . |
| 34 | **First** ( is <valueBOOLEAN> ) | **First (**is) | is |
| 35 | (**First** (λ) – λ) **∪ Follow** ( <varinitBOOLEAN> ) | **Follow(**<varinitBOOLEAN>) | ;, . |
| 36 | **First** ( ; id <varinitINT><vartailINT> ) | **First (**;) | ; |
| 37 | (**First** (λ) – λ) **∪ Follow** ( <vartailINT> ) | **Follow (**<vartailINT>) | . |
| 38 | **First** ( ; id <varinitDOUBLE><vartailDOUBLE>) | **First (**;) | ; |
| 39 | (**First** (λ) – λ) **∪ Follow** ( <vartailDOUBLE> ) | **Follow (**<vartailDOUBLE>) | . |
| 40 | **First** ( ; id <varinitCHAR><vartailCHAR> ) | **First (**;) | ; |
| 41 | (**First** (λ) – λ) **∪ Follow** ( <vartailCHAR> ) | **Follow (**<vartailCHAR>) | . |
| 42 | **First** ( ; id <varinitSTRING><vartailSTRING> ) | **First (**;) | ; |
| 43 | (**First** (λ) – λ) **∪ Follow** ( <vartailSTRING> ) | **Follow (**<vartailSTRING>) | . |
| 44 | **First** ( ; id <varinitBOOLEAN><vartailBOOLEAN> ) | **First (**;) | ; |
| 45 | (**First** (λ) – λ) **∪ Follow** ( <vartailBOOLEAN> ) | **Follow (**<vartailBOOLEAN>) | . |
| 46 | **First** ( charlit ) | **First (**charlit) | charlit |
| 47 | **First** ( id <id\_tail> ) | **First (**id) | id |
| 48 | **First** ( stringlit ) | **First (**stringlit) | stringlit |
| 49 | **First** ( id <id\_tail> ) | **First (**id) | id |
| 50 | **First** ( boollit ) | **First (**boollit) | boollit |
| 51 | **First** ( id <id\_tail> ) | **First (**id) | id |
| 52 | **First** ( <ids\_tail> ) | **First (**<ids\_tail>) | @, |
| 53 | **First** ( ( <task\_param> ) ) | **First (** ( ) | ( |
| 54 | **First** ( <id\_choices> ) | **First (**<id\_choices>) | @, |
| 55 | (**First** (λ) – λ) **∪ Follow** ( <ids\_tail> ) | **Follow (**<ids\_tail>) | =, ++, --, ;, ., +, -, \*, /, %, ) |
| 56 | **First** ( @ <elements> ) | **First (**@) | @ |
| 57 | **First** ( [ <index> ] <index\_tail> ) | **First (** [ ) | [ |
| 58 | **First** ( <value><task\_param\_tail> ) | **First (**<value>) | intlit, doublelit, stringlit, charlit, boollit, id |
| 59 | (**First** (λ) – λ) **∪ Follow** ( <task\_param> ) | **Follow (**<task\_param>) | ) |
| 60 | **First** ( ; <task\_param> ) | **First (**;) | ; |
| 61 | (**First** (λ) – λ) **∪ Follow** ( <task\_param\_tail> ) | **Follow (**<task\_param\_tail>) | ) |
| 62 | **First** ( <values> ) | **First (**<values>) | intlit, doublelit, stringlit, charlit, boollit |
| 63 | **First** ( <elements> ) | **First (**<elements>) | id |
| 64 | **First** ( <index\_value><indexop> ) | **First (**<index\_value>) | id, intlit |
| 65 | **First** ( <add\_min><index\_value> ) | **First (**<add\_min>) | +, - |
| 66 | **First** ( + ) | **First (**+) | + |
| 67 | **First** ( - ) | **First (**-) | - |
| 68 | **First** ( id ) | **First (**id) | id |
| 69 | **First** ( intlit ) | **First (**intlit) | intlit |
| 70 | **First** ( [ <index> ] ) | **First (**[) | [ |
| 71 | **First** ( id <elements\_tail> ) | **First (**id) | id |
| 72 | **First** ( @ <elements> ) | **First (**@) | @ |
| 73 | (**First** (λ) – λ) **∪ Follow** ( <elements\_tail> ) | **Follow(**<elements\_tail>) | Start, ;, ), ,, ==, !=, >, >=, <, <=, =, ++, --, ., +, -, \*, /, % |
| 74 | **First** ( Array <datatype> of intlit<size\_tail> ) | **First (**Array) | Array |
| 75 | **First** ( by intlit ) | **First (**by) | by |
| 76 | (**First** (λ) – λ) **∪ Follow** ( <size\_tail> ) | **Follow(**<size\_tail>) | . |
| 77 | **First** ( Task <return\_type><parameters> ) | **First (**Task) | Task |
| 78 | **First** ( <datatype> ) | **First (**<datatype>) | Int, Double, Char, String, Boolean |
| 79 | **First** ( Null id ) | **First (**Null) | Null |
| 80 | **First** ( ( <datatype><param\_tail> ) ) | **First (** ( ) | ( |
| 81 | (**First** (λ) – λ) **∪ Follow** ( <parameters> ) | **Follow (**<parameters>) | . |
| 82 | **First** ( ; <datatype><param\_tail> ) | **First (**;) | ; |
| 83 | (**First** (λ) – λ) **∪ Follow** ( <param\_tail> ) | **Follow (**<param\_tail>) | ) |
| 84 | **First** ( Object id Start <object\_elem> End <object\_var> ) | **First (**Object) | Object |
| 85 | **First** ( Var <datatype> . <object\_elem\_tail> ) | **First (**Var) | Var |
| 86 | **First** ( Object id id . <object\_elem\_tail> ) | **First (**Object) | Object |
| 87 | **First** ( <object\_elem> ) | **First (**<object\_elem>) | Var, Object |
| 88 | (**First** (λ) – λ) **∪ Follow** ( <object\_elem\_tail> ) | **Follow (**<object\_elem\_tail>) | End |
| 89 | **First** ( id <object\_var\_tail> ) | **First (**id) | id |
| 90 | (**First** (λ) – λ) **∪ Follow** ( <object\_var> ) | **Follow (**<object\_var>) | . |
| 91 | **First** ( ; <object\_var> ) | **First (**;) | ; |
| 92 | (**First** (λ) – λ) **∪ Follow** ( <object\_var\_tail> ) | **Follow (**<object\_var\_tail>) | . |
| 93 | **First** ( <functions> . <statements> ) | **First (**<functions>) | Object, Clear, Var, Read, Say, Option, Until, Do, For, Array, If, ++, --, id |
| 94 | (**First** (λ) – λ) **∪ Follow** ( <statements> ) | **Follow (**<statements>) | Stop, End, Response |
| 95 | **First** ( <vardec> ) | **First (**<vardec>) | Var |
| 96 | **First** ( <array> ) | **First (**<array>) | Array |
| 97 | **First** ( Object id id ) | **First (**Object) | Object |
| 98 | **First** ( <io\_statement> ) | **First (**<io\_statement>) | Read, Say |
| 99 | **First** ( <pre\_incdec> ) | **First (**<pre\_incdec>) | ++, -- |
| 100 | **First** ( Clear ) | **First (**Clear) | Clear |
| 101 | **First** ( <option> ) | **First (**<option>) | Option |
| 102 | **First** ( <IfOtherwise> ) | **First (**<IfOtherwise>) | If |
| 103 | **First** ( <loopstate> ) | **First (**<loopstate>) | Until, Do, For |
| 104 | **First** ( <id\_stmt> ) | **First (**<id\_stmt>) | id |
| 105 | **First** ( Read id <ids\_tail> ) | **First (**Read) | Read |
| 106 | **First** ( Say <output\_statement> ) | **First (**Say) | Say |
| 107 | **First** ( stringlit<concat> ) | **First (**stringlit) | stringlit |
| 108 | **First** ( id <id\_choices><concat> ) | **First (**id) | id |
| 109 | **First** ( , <output\_statement> ) | **First (**,) | , |
| 110 | (**First** (λ) – λ) **∪ Follow** ( <concat> ) | **Follow(**<concat>) | . |
| 111 | **First** ( ++ id ) | **First (**++) | ++ |
| 112 | **First** ( -- id ) | **First (**--) | -- |
| 113 | **First** ( Option <elements> Start State <option\_choices> ) | **First (**Option) | Option |
| 114 | **First** ( <optionINT> ) | **First (**<optionINT>) | intlit |
| 115 | **First** ( <optionCHAR> ) | **First (**<optionChar>) | charlit |
| 116 | **First** ( <optionSTRING> ) | **First (**<optionSTRING >) | stringlit |
| 117 | **First** ( intlit : <statements> Stop . <stateINT><default> End ) | **First (**intlit) | intlit |
| 118 | **First** ( charlit : <statements> Stop . <stateCHAR><default> End ) | **First (**charlit) | charlit |
| 119 | **First** ( stringlit : <statements> Stop . <stateSTRING><default> End ) | **First (**stringlit) | stringlit |
| 120 | **First** ( State intlit : <statements> Stop . <stateINT> ) | **First (**State) | State |
| 121 | (**First** (λ) – λ) **∪ Follow** ( <stateINT> ) | **Follow(**<stateINT>) | Object, Clear, Var, Read, Say, Option, Until, Do, For, Array, If, ++, --, id, Default |
| 122 | **First** ( State charlit : <statements> Stop . <stateCHAR> ) | **First (**State) | State |
| 123 | (**First** (λ) – λ) **∪ Follow** ( <stateCHAR> ) | **Follow(**<stateCHAR>) | Object, Clear, Var, Read, Say, Option, Until, Do, For, Array, If, ++, --, id, Default |
| 124 | **First** ( State stringlit : <statements> Stop . <stateSTRING> ) | **First (**State) | State |
| 125 | (**First** (λ) – λ) **∪ Follow** ( <stateSTRING> ) | **Follow (**<stateSTRING>) | Object, Clear, Var, Read, Say, Option, Until, Do, For, Array, If, ++, --, id, Default |
| 126 | **First** ( Default : <statements> ) | **First (**Default) | Default |
| 127 | (**First** (λ) – λ) **∪ Follow** ( <default> ) | **Follow(**<default>) | End |
| 128 | **First** ( <condition\_choices> ) | **First (**<condition\_choices>) | id, intlit, doublelit, stringlit, charlit, boollit |
| 129 | **First** ( <negate> ( <condition\_choices> ) <logOp\_tail> ) | **First (**<negate>) | !, ( |
| 130 | **First** ( id <condition\_ids><relOp><condition\_tail> ) | **First (**id) | id |
| 131 | **First** ( <values><relOp><condition\_tail> ) | **First (**<values>) | intlit, doublelit, stringlit, charlit, boollit |
| 132 | **First** ( id <condition\_ids> ) | **First (**id) | id |
| 133 | **First** ( <values> ) | **First (**<values>) | intlit, doublelit, stringlit, charlit, boollit |
| 134 | **First** ( <id\_choices> ) | **First (**<id\_choices>) | @, |
| 135 | **First** ( ( <task\_param> ) ) | **First (** ( ) | ( |
| 136 | **First** ( <logOp><logOp\_choices><logOp\_tail> ) | **First (**<lopOp>) | &&, || |
| 137 | (**First** (λ) – λ) **∪ Follow** ( <logOp\_tail> ) | **Follow(**<logOp\_tail>) | &&, ||, ) |
| 138 | **First** ( <negate> ( <condition\_choices> ) ) | **First (**<negate>) | !, ( |
| 139 | **First** ( boollit<logOp\_tail> ) | **First (**boollit) | boollit |
| 140 | **First** ( == ) | **First (**==) | == |
| 141 | **First** ( != ) | **First (**!=) | != |
| 142 | **First** ( > ) | **First (**>) | > |
| 143 | **First** ( >= ) | **First (**>=) | >= |
| 144 | **First** ( < ) | **First (**<) | < |
| 145 | **First** ( <= ) | **First (**<=) | <= |
| 146 | **First** ( && ) | **First (**&&) | && |
| 147 | **First** ( || ) | **First (**||) | || |
| 148 | **First** ( ! ) | **First (** ! ) | ! |
| 149 | (**First** (λ) – λ) **∪ Follow** ( <negate> ) | **Follow(**<negate>) | ( |
| 150 | **First** ( If ( <conditions> ) <cond\_loop><or><otherwise>EndIf ) | **First (**If) | If |
| 151 | **First** ( Or ( <conditions> ) <cond\_loop><or> ) | **First (**Or) | Or |
| 152 | (**First** (λ) – λ) **∪ Follow** ( <or> ) | **Follow(**<or>) | (, id, intlit, doublelit, stringlit, charlit, boollit, !, Otherwise |
| 153 | **First** ( Otherwise <cond\_loop><control> ) | **First (**Otherwise) | Otherwise |
| 154 | (**First** (λ) – λ) **∪ Follow** ( <otherwise> ) | **Follow (**<otherwise>) | EndIf |
| 155 | **First** ( <functions> . <control><cond\_loop> ) | **First (**<functions>) | Object, Clear, Var, Read, Say, Option, Until, Do, For, Array, If, ++, --, id |
| 156 | (**First** (λ) – λ) **∪ Follow** ( <cond\_loop> ) | **Follow (**<cond\_loop>) | Loop, LoopIf, Skip, Stop, Or, (, id, intlit, doublelit, stringlit, charlit, boollit, !, ), EndIf, Otherwise |
| 157 | **First** ( Skip . ) | **First (**Skip) | Skip |
| 158 | **First** ( Stop . ) | **First (**Stop) | Stop |
| 159 | (**First** (λ) – λ) **∪ Follow** ( <control> ) | **Follow(**<control>) | Object, Clear, Var, Read, Say, Option, Until, Do, For, Array, If, ++, --, id, Loop, LoopIf, Skip, Stop, Or, (, intlit, doublelit, stringlit, charlit, boollit, !, ), EndIf, Otherwise |
| 160 | **First** ( Until ( <conditions> ) <cond\_loop> Loop) | **First (**Until) | Until |
| 161 | **First** ( Do <cond\_loop>LoopIf ( <conditions> ) ) | **First (**Do) | Do |
| 162 | **First** ( For ( <initialize> ; <cond> ; <incdecvar> ) <cond\_loop> Loop ) | **First (**For) | For |
| 163 | **First** ( id = <init\_choices> ) | **First (**id) | id |
| 164 | (**First** (λ) – λ) **∪ Follow** ( <initialize> ) | **Follow(**<initialize>) | ; |
| 165 | **First** ( intlit ) | **First (**intlit) | intlit |
| 166 | **First** ( id ) | **First (**id) | id |
| 167 | **First** ( <init\_choices><relOp><init\_choices> ) | **First (**<init\_choices>) | intlit, id |
| 168 | (**First** (λ) – λ) **∪ Follow** ( <cond> ) | **Follow (**<cond>) | ; |
| 169 | **First** ( <incdec> id ) | **First (**<incdec>) | ++, -- |
| 170 | **First** ( id <incdec> ) | **First (**id) | id |
| 171 | **First** ( id <id\_stmt\_tail> ) | **First (**id) | id |
| 172 | **First** ( <ids\_tail> = <initvalues> ) | **First (**<ids\_tail>) | @, , = |
| 173 | **First** ( ( <task\_param> ) ) | **First (** ( ) | ( |
| 174 | **First** ( <mathopNUM> ) | **First (**<mathopNUM>) | (, intlit, doublelit, id, ++, -- |
| 175 | **First** ( charlit ) | **First (**charlit) | charlit |
| 176 | **First** ( stringlit ) | **First (**stringlit) | stringlit |
| 177 | **First** ( boollit ) | **First (**boollit) | boollit |
| 178 | **First** ( <intvalue><mathopINT\_tail> ) | **First (**<intvalue>) | intlit, id, ++, -- |
| 179 | **First** ( ( <mathopINT> ) <mathopINT\_tail> ) | **First (** ( ) | ( |
| 180 | **First** ( <doublevalue><mathopDOUBLE\_tail> ) | **First (**<doublevalue>) | doublelit, id, ++, -- |
| 181 | **First** ( ( <mathopDOUBLE> ) <mathopDOUBLE\_tail> ) | **First (** ( ) | ( |
| 182 | **First** ( <numvalue><mathopNUM\_tail> ) | **First (**<numvalue>) | intlit, doublelit, id, ++, -- |
| 183 | **First** ( ( <mathopNUM> ) <mathopNUM\_tail> ) | **First (** ( ) | ( |
| 184 | **First** ( intlit ) | **First (**intlit) | intlit |
| 185 | **First** ( <exprID> ) | **First (**<exprID>) | id, ++, -- |
| 186 | **First** ( doublelit ) | **First (**doublelit) | doublelit |
| 187 | **First** ( <exprID> ) | **First (**<exprID>) | id, ++, -- |
| 188 | **First** ( intlit ) | **First (**intlit) | intlit |
| 189 | **First** ( doublelit ) | **First (**doublelit) | doublelit |
| 190 | **First** ( <exprID> ) | **First (**<exprID>) | id, ++, -- |
| 191 | **First** ( id <id\_tail><incdec\_null> ) | **First (**id) | id |
| 192 | **First** ( <pre\_incdec><id\_tail> ) | **First (**<pre\_incdec>) | ++, -- |
| 193 | **First** ( <operators><mathopINT> ) | **First (**<operators>) | +, -, \*, /, % |
| 194 | (**First** (λ) – λ) **∪ Follow** ( <mathopINT\_tail> ) | **Follow(**<mathopINT\_tail>) | ), ;, . |
| 195 | **First** ( <operators><mathopDOUBLE> ) | **First (**<operators>) | +, -, \*, /, % |
| 196 | (**First** (λ) – λ) **∪ Follow**  ( <mathopDOUBLE\_tail> ) | **Follow(**<mathopDOUBLE\_tail >) | ), ;, . |
| 197 | **First** ( <operators><mathopNUM> ) | **First (**<operators>) | +, -, \*, /, % |
| 198 | (**First** (λ) – λ) **∪ Follow** ( <mathopNUM\_tail> ) | **Follow (**<mathopNUM\_tail >) | ), . |
| 199 | **First** ( + ) | **First (**+) | + |
| 200 | **First** ( - ) | **First (**-) | - |
| 201 | **First** ( \* ) | **First (**\*) | \* |
| 202 | **First** ( / ) | **First (**/) | / |
| 203 | **First** ( % ) | **First (**%) | % |
| 204 | **First** ( ++ ) | **First (**++) | ++ |
| 205 | **First** ( -- ) | **First (**--) | -- |
| 206 | **First** ( <incdec> ) | **First (**<incdec>) | ++, -- |
| 207 | (**First** (λ) – λ) **∪ Follow** ( <incdec\_null> ) | **Follow(**<incdec\_null>) | +, -, \*, /, %, ), ., ; |
| 208 | **First** ( Task <return\_id> End . <taskdef> ) | **First (**Task) | Task |
| 209 | (**First** (λ) – λ) **∪ Follow** ( <taskdef> ) | **Follow(**<taskdef>) | # |
| 210 | **First** ( Int id : <taskbody> Response <returnINT> . ) | **First (**Int) | Int |
| 211 | **First** ( Double id : <taskbody> Response <returnDOUBLE> . ) | **First (**Double) | Double |
| 212 | **First** ( Char id : <taskbody> Response <returnCHAR> . ) | **First (**Char) | Char |
| 213 | **First** ( String id : <taskbody> Response <returnSTRING> . ) | **First (**String) | String |
| 214 | **First** ( Boolean id : <taskbody> Response <returnBOOLEAN> . ) | **First (**Boolean) | Boolean |
| 215 | **First** ( Null id : <taskbody> ) | **First (**Null) | Null |
| 216 | **First** ( Start <taskbodytail> ) | **First (**Start) | Start |
| 217 | **First** ( <statements> ) | **First (**<statements>) | Object, Clear, Var, Read, Say, Option, Until, Do, For, Array, If, ++, --, id |
| 218 | **First** ( intlit ) | **First (**intlit) | intlit |
| 219 | **First** ( id <returntail> ) | **First (**id) | id |
| 220 | **First** ( doublelit ) | **First (**doublelit) | doublelit |
| 221 | **First** ( id <returntail> ) | **First (**id) | id |
| 222 | **First** ( charlit ) | **First (**charlit) | charlit |
| 223 | **First** ( id <returntail> ) | **First (**id) | id |
| 224 | **First** ( stringlit ) | **First (**stringlit) | stringlit |
| 225 | **First** ( id <returntail> ) | **First (**id) | id |
| 226 | **First** ( boollit ) | **First (**boollit) | boollit |
| 227 | **First** ( id <returntail> ) | **First (**id) | id |
| 228 | **First** ( ( <task\_param> ) ) | **First (** ( ) | ( |
| 229 | **First** ( <elements> ) | **First (**<elements>) | id |
| 230 | (**First** (λ) – λ) **∪ Follow** ( <returntail> ) | **Follow (**<returntail>) | . |
| 231 | **First** ( <program># ) | **First (**<program>) | Lead, Let, Array, Object, Var, Task |