```
Parsed ../test/libic.sig successfully!

1: Declaration of class: Library
2: Declaration of library method: println
2: Primitive data type: void
2: Parameter: s
2: Primitive data type: string
3: Declaration of library method: print
3: Primitive data type: void
3: Parameter: s
3: Primitive data type: string
4: Declaration of library method: printi
4: Primitive data type: void
4: Parameter: i
4: Primitive data type: int
5: Declaration of library method: printb
5: Primitive data type: void
5: Parameter: b
5: Primitive data type: boolean
7: Declaration of library method: readi
7: Primitive data type: int
8: Declaration of library method: readln
8: Primitive data type: string
9: Declaration of library method: eof
9: Primitive data type: boolean
11: Declaration of library method: stoi
11: Primitive data type: int
11: Parameter: s
11: Primitive data type: string
11: Parameter: n
11: Primitive data type: int
13: Declaration of library method: itos
13: Primitive data type: string
13: Parameter: i
13: Primitive data type: int
14: Declaration of library method: stoa
14: Primitive data type: 1-dimensional array of int
14: Parameter: s
14: Primitive data type: string
15: Declaration of library method: atos
15: Primitive data type: string
15: Parameter: a
15: Primitive data type: 1-dimensional array of int
17: Declaration of library method: random
17: Primitive data type: int
17: Parameter: n
17: Primitive data type: int
18: Declaration of library method: time
18: Primitive data type: int
19: Declaration of library method: exit
19: Primitive data type: int
19: Parameter: i
19: Primitive data type: int
```

```
Parsed ../test/Quicksort.ic successfully!

Abstract Syntax Tree: ../test/Quicksort.ic

15: Declaration of class: Quicksort
16: Declaration of field: a
16: Primitive data type: 1-dimensional array of int
18: Declaration of virtual method: partition
18: Primitive data type: int
18: Parameter: low
18: Primitive data type: int
18: Parameter: high
18: Primitive data type: int
19: Declaration of local variable: pivot, with initial value
19: Primitive data type: int
19: Reference to array
19: Reference to variable: a
19: Reference to variable: low
20: Declaration of local variable: i, with initial value
20: Primitive data type: int
20: Reference to variable: low
21: Declaration of local variable: j, with initial value
21: Primitive data type: int
21: Reference to variable: high
22: Declaration of local variable: tmp
22: Primitive data type: int
24: While statement
24: Boolean literal: true
24: Block of statements
25: While statement
25: Logical binary operation: less than
25: Reference to array
25: Reference to variable: a
25: Reference to variable: i
25: Reference to variable: pivot
25: Assignment statement
25: Reference to variable: i
25: Mathematical binary operation: addition
25: Reference to variable: i
25: Integer literal: 1
26: While statement
26: Logical binary operation: greater than
26: Reference to array
26: Reference to variable: a
26: Reference to variable: j
26: Reference to variable: pivot
26: Assignment statement
26: Reference to variable: j
26: Mathematical binary operation: subtraction
26: Reference to variable: j
26: Integer literal: 1
28: If statement
28: Logical binary operation: greater than or equal to
28: Reference to variable: i
28: Reference to variable: j
28: Break statement
30: Assignment statement
30: Reference to variable: tmp
30: Reference to array
30: Reference to variable: a
30: Reference to variable: i
```

```
31: Assignment statement
31: Reference to array
31: Reference to variable: a
31: Reference to variable: i
31: Reference to array
31: Reference to variable: a
31: Reference to variable: j
32: Assignment statement
32: Reference to array
32: Reference to variable: a
32: Reference to variable: j
32: Reference to variable: tmp
33: Assignment statement
33: Reference to variable: i
33: Mathematical binary operation: addition
33: Reference to variable: i
33: Integer literal: 1
34: Assignment statement
34: Reference to variable: j
34: Mathematical binary operation: subtraction
34: Reference to variable: j
34: Integer literal: 1
37: Return statement, with return value
37: Reference to variable: j
40: Declaration of virtual method: quicksort
40: Primitive data type: void
40: Parameter: low
40: Primitive data type: int
40: Parameter: high
40: Primitive data type: int
41: If statement
41: Logical binary operation: less than
41: Reference to variable: low
41: Reference to variable: high
41: Block of statements
42: Declaration of local variable: mid, with initial value
42: Primitive data type: int
42: Call to virtual method: partition
42: Reference to variable: low
42: Reference to variable: high
43: Method call statement
43: Call to virtual method: quicksort
43: Reference to variable: low
43: Reference to variable: mid
44: Method call statement
44: Call to virtual method: quicksort
44: Mathematical binary operation: addition
44: Reference to variable: mid
44: Integer literal: 1
44: Reference to variable: high
48: Declaration of virtual method: initArray
48: Primitive data type: void
49: Declaration of local variable: i, with initial value
49: Primitive data type: int
49: Integer literal: 0
50: While statement
50: Logical binary operation: less than
50: Reference to variable: i
50: Reference to array length
50: Reference to variable: a
50: Block of statements
```

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51: Assignment statement
51: Reference to array
51: Reference to variable: a
51: Reference to variable: i
51: Call to static method: random, in class Library
51: Mathematical binary operation: multiplication
51: Reference to array length
51: Reference to variable: a
51: Integer literal: 2
52: Assignment statement
52: Reference to variable: i
52: Mathematical binary operation: addition
52: Reference to variable: i
52: Integer literal: 1
56: Declaration of virtual method: printArray
56: Primitive data type: void
57: Declaration of local variable: i, with initial value
57: Primitive data type: int
57: Integer literal: 0
59: Method call statement
59: Call to static method: print, in class Library
59: String literal: "\"Array elements: \""
60: While statement
60: Logical binary operation: less than
60: Reference to variable: i
60: Reference to array length
60: Reference to variable: a
60: Block of statements
61: Method call statement
61: Call to static method: printi, in class Library
61: Reference to array
61: Reference to variable: a
61: Reference to variable: i
62: Method call statement
62: Call to static method: print, in class Library
62: String literal: "\" \""
63: Assignment statement
63: Reference to variable: i
63: Mathematical binary operation: addition
63: Reference to variable: i
63: Integer literal: 1
65: Method call statement
65: Call to static method: print, in class Library
65: String literal: "\"\\n\""
68: Declaration of static method: main
68: Primitive data type: void
68: Parameter: args
68: Primitive data type: 1-dimensional array of string
69: Declaration of local variable: n
69: Primitive data type: int
71: If statement
71: Logical binary operation: inequality
71: Reference to array length
71: Reference to variable: args
71: Integer literal: 1
71: Block of statements
72: Method call statement
72: Call to static method: println, in class Library
72: String literal: "\"Unspecified array length\""
73: Method call statement
73: Call to static method: exit, in class Library
```

```
73: Integer literal: 1
76: Assignment statement
76: Reference to variable: n
76: Call to static method: stoi, in class Library
76: Reference to array
76: Reference to variable: args
76: Integer literal: 0
76: Integer literal: 0
77: If statement
77: Logical binary operation: less than or equal to
77: Reference to variable: n
77: Integer literal: 0
77: Block of statements
78: Method call statement
78: Call to static method: println, in class Library
78: String literal: "\"Invalid array length\""
79: Method call statement
79: Call to static method: exit, in class Library
79: Integer literal: 1
81: Declaration of local variable: s, with initial value
81: User-defined data type: Quicksort
81: Instantiation of class: Quicksort
82: Assignment statement
82: Reference to variable: a, in external scope
82: Reference to variable: s
82: Array allocation
82: Primitive data type: int
82: Reference to variable: n
84: Method call statement
84: Call to virtual method: initArray, in external scope
84: Reference to variable: s
85: Method call statement
85: Call to virtual method: printArray, in external scope
85: Reference to variable: s
86: Method call statement
86: Call to virtual method: quicksort, in external scope
86: Reference to variable: s
86: Integer literal: 0
86: Mathematical binary operation: subtraction
86: Reference to variable: n
86: Integer literal: 1
87: Method call statement
87: Call to virtual method: printArray, in external scope
87: Reference to variable: s
```