

Program

```
|--Func: swap (a -> ptr to int, b -> ptr to int) -> void
|   |--Var: tmp -> int
|       |--Initializer
|           |--UnaryExp
|               |--Indirection
|                   |--Id: a
|   |--ExpressionStmt
|       |--AssignExp: =
|           |--UnaryExp
|               |--Indirection
|                   |--Id: a
|           |--UnaryExp
|               |--Indirection
|                   |--Id: b
|   |--ExpressionStmt
|       |--AssignExp: =
|           |--UnaryExp
|               |--Indirection
|                   |--Id: b
|           |--Id: tmp
|--Func: partition (A -> ptr to int, p -> int, r -> int) -> int
|   |--Var: x -> int
|       |--Initializer
|           |--PostfixExp
|               |--Id: A
|               |--Index:
|                   |--Id: r
|   |--Var: i -> int
|       |--Initializer
|           |--BinaryExp: -
|               |--Id: p
|               |--Int-Const: 1
|   |--Var: j -> int
|       |--Initializer: Id: p
|--FOR_X00
|   |--BinaryExp: <=
|       |--Id: j
|       |--BinaryExp: -
|           |--Id: r
|           |--Int-Const: 1
|   |--PostfixExp
|       |--Id: j
|       |--Post increment
|   |--SelectionStmt
|       |--BinaryExp: <=
|           |--PostfixExp
|               |--Id: A
|               |--Index:
|                   |--Id: j
|           |--Id: x
|       |--CompoundStmt
|           |--ExpressionStmt
|               |--UnaryExp
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|--Prefix inc
|--Id: i
--ExpressionStmt
  |--PostfixExp
    |--Id: swap
    --Call with parameters:
      |--UnaryExp
        |--Address of
        |--PostfixExp
          |--Id: A
          |--Index:
          |--Id: i
        --UnaryExp
          |--Address of
          |--PostfixExp
            |--Id: A
            |--Index:
            |--Id: j
      --ExpressionStmt
        |--UnaryExp
          |--Prefix inc
          |--Id: i
      --ExpressionStmt
        |--PostfixExp
          |--Id: swap
          --Call with parameters:
            |--UnaryExp
              |--Address of
              |--PostfixExp
                |--Id: A
                |--Index:
                |--Id: i
            --UnaryExp
              |--Address of
              |--PostfixExp
                |--Id: A
                |--Index:
                |--Id: r
          --RETURN
            |--Id: i
--Func: qsort (A -> ptr to int, p -> int, r -> int) -> void
  --Var: q -> int
    --Initializer
      |--UnaryExp
        |--Unary minus
        |--Int-Const: 1
  --SelectionStmt
    |--BinaryExp: <
      |--Id: p
      |--Id: r
    --CompoundStmt
      --ExpressionStmt
        |--AssignExp: =
          |--Id: q

```

```

|--PostfixExp
|   |--Id: partition
|   |--Call with parameters:
|       |--Id: A
|       |--Id: p
|       |--Id: r
|--ExpressionStmt
|   |--PostfixExp
|       |--Id: qsort
|       |--Call with parameters:
|           |--Id: A
|           |--Id: p
|           |--BinaryExp: -
|               |--Id: q
|               |--Int-Const: 1
|--ExpressionStmt
|   |--PostfixExp
|       |--Id: qsort
|       |--Call with parameters:
|           |--Id: A
|           |--BinaryExp: +
|               |--Id: q
|               |--Int-Const: 1
|       |--Id: r
--Func: main (argc -> int, argv -> ptr to ptr to char) -> int
|--Var: i -> int
|   |--Initializer: Int-Const: 0
|--Var: a -> array of 10 int
|   |--InitializerList:
|       |--Initializer: Int-Const: 9
|       |--Initializer: Int-Const: 8
|       |--Initializer: Int-Const: 7
|       |--Initializer: Int-Const: 6
|       |--Initializer: Int-Const: 5
|       |--Initializer: Int-Const: 4
|       |--Initializer: Int-Const: 3
|       |--Initializer: Int-Const: 2
|       |--Initializer: Int-Const: 1
|       |--Initializer: Int-Const: 0
|--ExpressionStmt
|   |--PostfixExp
|       |--Id: qsort
|       |--Call with parameters:
|           |--Id: a
|           |--Int-Const: 0
|           |--Int-Const: 9
--FOR_X00
|   |--BinaryExp: <
|       |--Id: i
|       |--Int-Const: 10
|   |--PostfixExp
|       |--Id: i
|       |--Post increment
|--ExpressionStmt

```

```
| | | | --PostfixExp  
| | | | | --Id: printf  
| | | | | --Call with parameters:  
| | | | | | --Str: '%d\n'  
| | | | | | --PostfixExp  
| | | | | | | --Id: a  
| | | | | | | --Index:  
| | | | | | | --Id: i  
| | --RETURN  
| | | --Int-Const: 0
```