Semantic Analyser

By Team 8

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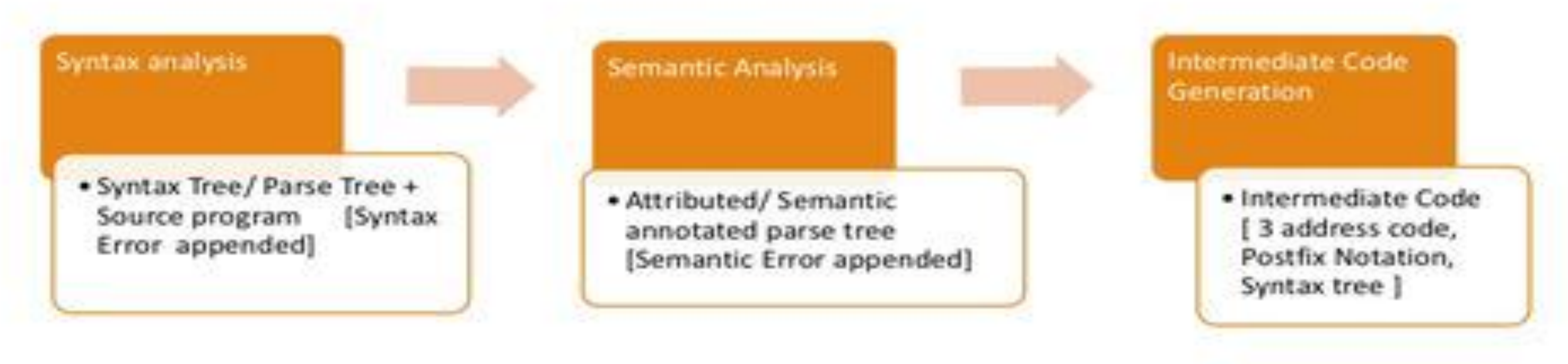
Role of a Semantic Analyser

The semantic analyser ensures that the declarations and statements of a program are semantically correct. It is basically a collection of procedures which can be called by the parser as and when required by grammar.



Syntax analysis

- Syntax Tree/ Parse Tree + Source program [Syntax Error appended]

Semantic Analysis

- Attributed/ Semantic annotated parse tree [Semantic Error appended]

Intermediate Code Generation

- Intermediate Code [3 address code, Postfix Notation, Syntax tree]

Semantic Analyser Description for Tureasy

We have written the code for semantic analyser in the **semant.ml** file using Ocaml. This file also contains calls of functions whose purpose is to generate the intermediate representation of the program which is used by the backend.

A small snippet of our code:

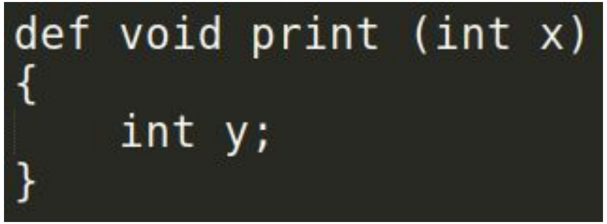
```
let check_for_void errormsg = function
   (_, Datatype(typ), name, _, _) when typ = Void -> raise (Failure (errormsg name))
 | _ -> ()


let check_duplicate errormsg lst =
 let rec help_check = function
     elem1 :: elem2 :: _ when elem1 = elem2 -> raise (Failure (errormsg elem2))
   | _ :: rem -> help_check rem
   | [] -> ()
 in help_check (List.sort compare lst)
```

Example 1

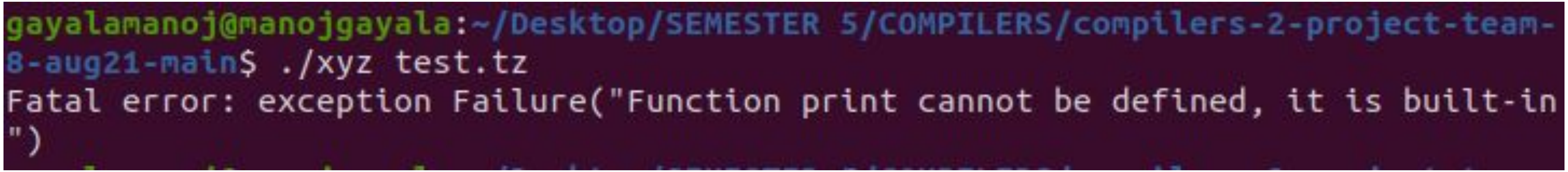
Incorrect naming of function:

Code Example:



```
def void print (int x)
{
    int y;
}
```

Output of semantic analyser:

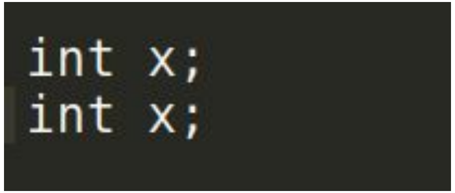


```
gayalamanoj@manojgayala:~/Desktop/SEMESTER 5/COMPILERS/compilers-2-project-team-
8-aug21-main$ ./xyz test.tz
Fatal error: exception Failure("Function print cannot be defined, it is built-in
")
```

Example 2:

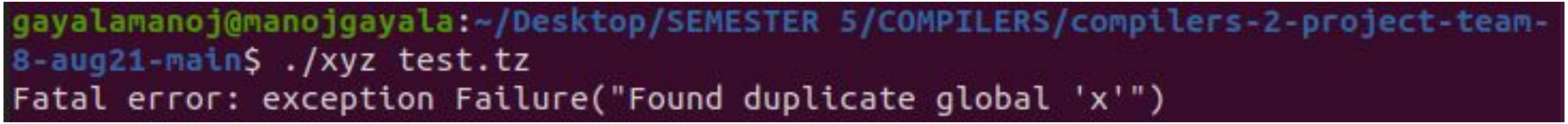
Duplicates detection:

Code example:



```
int x;
int x;
```

Output of the semantic analyser:



```
gayalamanoj@manojgayala:~/Desktop/SEMESTER 5/COMPILERS/compilers-2-project-team-
8-aug21-main$ ./xyz test.tz
Fatal error: exception Failure("Found duplicate global 'x'")
```