Compiler Construction

Lecture # 05

Mr. Usman Wajid

usman.wajid@nu.edu.pk

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Symbol Table Management

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- for function (or procedure names), the attributes may provide the number, type and sequence of arguments, the method of passing each argument and the return type
- hence, the symbol table is a data structure containing a record for each variable name with corresponding fields of attributes
- it should allow the compiler to find, store and retrieve data from the record quickly

Compiler Construction Tools

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3. **Syntax-directed Translation Engines:** they produce collection of routines for walking a parse tree and generating intermediate code
4. **Code-generator Generators:** they produce target machine code by manipulating each rule for translating each operation of the intermediate code

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6. **Compiler-construction Toolkits:** they provide an integrated set of routines for construction various phases of a compiler.

Assignment # 01

1. The Evolution of Programming Languages and its Impact on Computer Performance
2. Programming Language Generations
3. its Impact on Computer Performance

Compiler Applications

1. Implementation of high level languages

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2. optimization for computer architectures

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5. software productivity tools

Programming Language Basics

Static Policy

A policy that allows the compiler to address an issue then it is known as static policy

Dynamic Policy

A policy that addresses an issue during execution or run-time is known as dynamic policy

Programming Language Basics continued . . .

Environment

It refers to the mapping of names (variables) to locations (memory addresses).

Environments may change according to the scope rules of a language

States

It refers to the mapping of locations (addresses) to values

Programming Language Basics continued . . .

Identifier

It is a string of characters (letters or digits), that refers to an entity, such as a data object, a procedure (function), a class or a type

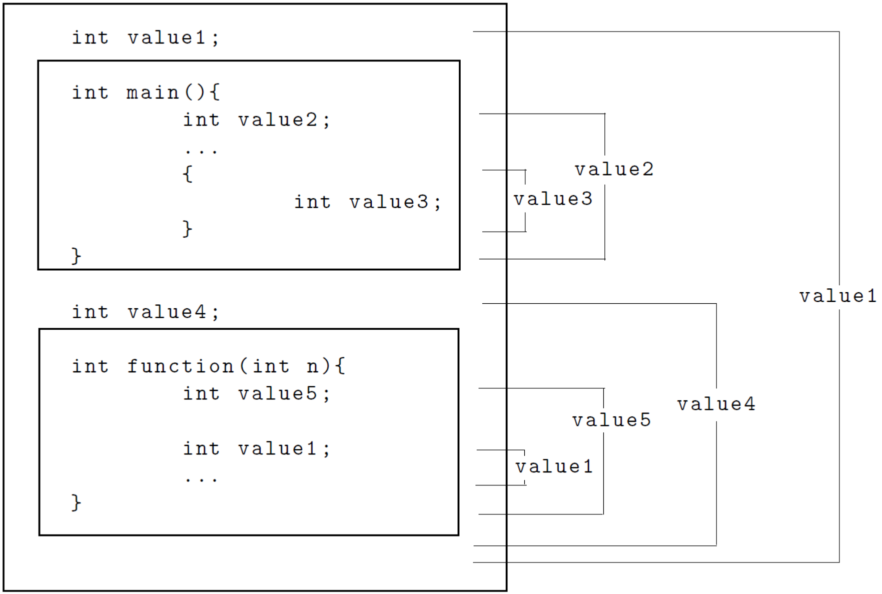
e.g., int result, class Box , void add, struct node etc

Variables

A variable is an instance of an identifier that refers to a particular location in memory.

An identifier can be declared more than once, each such `declaration` introduces a new variable

Variable Scope



```
int value1;

int main(){
        int value2;
        ...
        {
                int value3;
        }
}

int value4;

int function(int n){
        int value5;

        int value1;
        ...
}
```

Programming Language Basics continued . . .

Structure

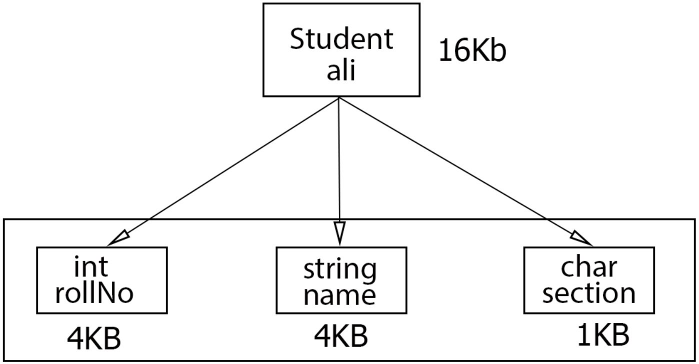
A structure is a collection of related data items that can be referenced with a single name

- The data items in structure are called members
- Unlike arrays, a structure can store members of different types
- Example code,

```
struct Student{
        int rollNo;
        string name;
        char section;
};

Student ali;
```

Structures


Student
ali
16Kb
int
rollNo
4KB
string
name
4KB
char
section
1KB

Programming Language Basics continued . . .

Function

It groups a number of statements into a single unit and assigns it a name

- It can be then invoked from other parts of program
- The function's body is stored in only one place of the memory
- Example,

```
void display(){
            ...
            ...
            ...
}
```