
CS 241

Control Structures

Christopher A. Gantz

SPS Undergraduate Program
Regis University
cgantz@regis.edu

Lecture Topic #13

CS 241: Modular Programming

Christopher A. Gantz
School of Professional Studies
Regis University
cgantz@regis.edu

Overview

- Reading
 - Nance textbook Pages 375-407
- Modular Programming
 - Global and local identifiers
 - Using Global Identifiers and Constants
 - Naming identifiers and Namespace Conflict
 - Forward References

Global and Local Identifiers

- A program can be thought of as a structural block
- A subprogram can be thought of as a structural subblock
- Each block whether a program or subprogram can contain the following
 - Parameter lists
 - Local declarations
 - A body of the block

Global and Local identifiers (Cont.)

- A block or subblock defines a scope of reference/access for the declared or defined identifiers
- The scope of an identifier is defined by the block in which it has been declared or defined
- Identifiers are NOT available for reference or access outside of the block in which it was declared or defined

Global and Local identifiers (Cont.)

- Identifiers declared or defined in the main block are referred to as global identifiers (or global variables)
- Identifiers declared within a subprogram (or sub block) are referred to as local identifiers (or local variables)
- An attempt to reference/access an identifier outside its declared or defined block will result in an error

Global and Local identifiers (Cont.)

- Identifiers that can be referenced/accessed within a block in which they weren't declared or defined are referred to as non-local identifiers
-

Global and Local identifiers (Cont.)

Program IllustrateScoping (input, output):

VAR

GlobalId : integer;

PROCEDURE Outer;

VAR

OuterLocalId : integer;

PROCEDURE Inner;

VAR

InnerLocalId : integer;

BEGIN

Using Global Identifiers & Constants

- Why utilize local identifiers within a procedure
 - Helps avoid unexpected side effects
 - Facilitates debugging and top-down design
 - Enhances portability of procedures
- Constant definitions are preferred to be global (i.e. Defined in the main program CONST subsection)

Naming of Identifiers & conflicts

- Identifiers with the same name can exist in different blocks (i.e. main blocks of subblocks)
- See code fragment examples on page 379 of text
-

Forward References

```
FUNCTION B (X: real) : real; FORWARD;
```

```
FUNCTION A (Ch: char) : char;
```

```
  BEGIN
```

```
  END; { of FUNCTION A }
```

```
FUNCTION B (X: real) : real;
```

```
  BEGIN
```

```
  END; {of FUNCTION B }
```