Local and Global Variables

COMP 110
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Properties of Variables

• Local variables are declared in a function
• Global variables are declared outside any function
• Local variables are not visible outside the function in which they are declared
• Global variables are normally visible both inside and outside all functions
• Exception
  – If a local variable has the same name as a global variable, it masks the existence of the global variable
Exercise

• Let’s create a recursive function to display part of the family tree of a person
• So that the exercise is not too complicated, let’s just display the paternal line
• That is, a person’s name, their father’s name, their father’s father’s name, and so forth

Example Output

• One more indent for every ancestor
• So we want something like this:
  – Annabel is at the base of the family tree
    • Annabel’s father is John
      – John’s father is Maxwell
        » Maxwell’s father is Joseph
Design Decisions

• To illustrate local and global variables, we impose two requirements:
  – The predefined array of paternal ancestor names must be \textit{global}
  – The index that keeps track of our location in the array must be \textit{local}

Simplified Problem

• Let’s solve this first to get started
• Create a global array of two strings to hold a person’s name and their father’s name
• Write a function that takes nothing as input displays the person’s name, and also their father’s name indented by five spaces
Recursion

• We can use recursion to print the whole paternal line
• How should we structure the recursive function?

Recursive Function Structure

function foo(index)
{
    Display whatever name is at this index
    Increment index
    Exit if index equals the array size
    Call foo(index) again
}
Procedural implementation

• We can also do this without recursion using loops

Procedural Code Structure

for(index = 0; index < array size; index++)
{
    for(s = 0; s < index; s++)
        print out five spaces
        print out array[index] and end the line
}