

Topic: Names, bindings, scopes, data types

1. Write a C/C++/Java subprogram (function) that includes the following sequence of statements:

```
nvalue = 5;  
int nvalue = 7;  
nvalue++
```

Run the program and explain the result. What problems can using global variables cause and how can they be overcome?

2. Write three functions in C or C++: one that declares a large array statically, one that declares the same large array on the stack and one that creates the same large array from the heap. Call each of the subprograms a large number of times (at least 100 000 times) and output the time required by each. Explain the results.
3. Design a set of simple test programs to determine the type compatibility rules of a C compiler to which you have access. Write a report of your findings.
4. Write a program that will read a sequence of positive real numbers entered by the user and will print the same numbers in sorted order from smallest to largest. The user will input a zero to mark the end of the input. Assume that at most 100 positive numbers will be entered.
5. Write a program in the language of your choice that behaves differently if the language uses name equivalence than if it uses structural equivalence.
6. Compare the usage of the assignment operator in C++ with that in Java.