Computer Programming

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Session: Names and Type Declarations in C++

Quick Recap of Some Relevant Topics

- Structure of a simple C++ program
- “main” function
- Variables and declarations

Overview of This Lecture

- Names in C++
- Type declarations
- Examples: variables, functions

Names in C++

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- In C++, names are used to represent ‘objects’
- Each object can have a value of certain type
  - Thus every name must have an associated type
- Values associated with named objects can change as program executes
- Constant values used in the program are also objects of a certain type

Names in C++

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- Name is any sequence of characters from A to Z, a to z, 0 to 9 and underscore ("_")
  - Cannot start with 0-9: 1MyVar not ok
  - Cannot be a C++ keyword: namespace, int, return, …
  - Can start with _ or any letter from A to Z, a to z: _MyVar_1 ok
  - Can be any length
    - Some compilers may limit length to some large number
    - Not a real concern in practice
- Meaningful names important for readability of program
  - Variable named averageMarks says what it is used for
  - Variable named xyz makes it difficult to understand its purpose

Type Declarations in C++

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- C++ allows several types of values

  char, int, float, double, void (valueless), bool …
- Type of object must be declared before its use
  - Format: typeName objectName
  - Example: int midSemMarks;
    char yesNoResponse;
- Compiler uses declarations to allocate memory space based on type
  - Example: midSemMarks requires 4 bytes
    yesNoResponse requires 1 byte

Type Declarations in C++

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- There exist ‘qualifiers’ to certain types
  - short int (2 bytes)
  - unsigned int (no sign bit)
  - long int (4 or 8 bytes)
  - unsigned char (1 byte for storing unsigned integer)
- Compiler uses qualifier to decide how much space to allocate and how to interpret stored value

Simple C++ Functions and Types

- Encapsulate a computational (sub)-task and give it a name
  - Same naming rules as for variables and objects
- Can accept optional input parameters and return values
  - Input parameters have names and types
  - Return value has type
  - Parameterized computation

Simple C++ Functions and Types

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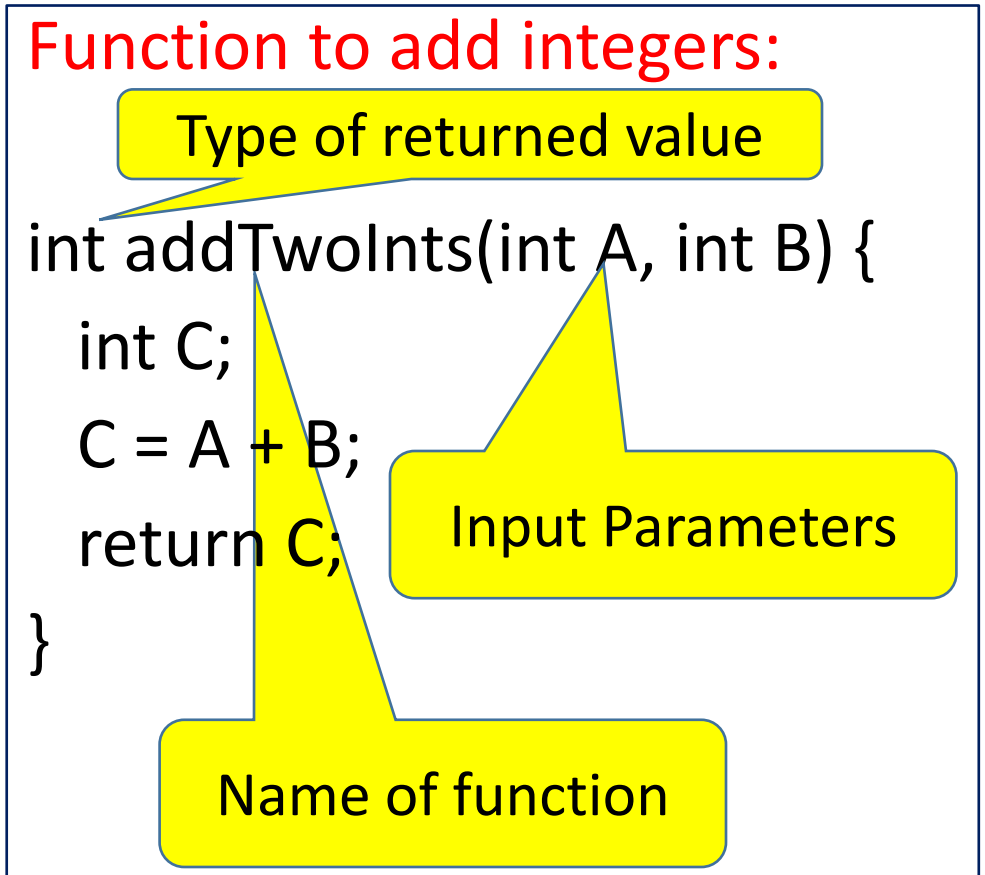
Our friendly summing program:

```
int main() {
   int A, B, C;
   cout << “Give two numbers”;
   cin >> A >> B;
   C = A + B;
   cout << “Sum is” <<  C;
   return 0;
}
```

Function to add integers:



Simple C++ Functions and Types

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- Just like variables, name and type of function must be declared before its use

```
int addTwoInts(int A, int B);

int addTwoInts(int A, int B) {
   int C;
   C = A + B;
   return C;
}
```

```
int main() {
   int A, B, C;
   cout << “Give two numbers”;
   cin >> A >> B;
   C = addTwoInts(A, B);
   cout << “Sum is” <<  C;
   return 0;
}
```

Summary

- Names in C++
  - Variables, functions …
- Type declarations
  - Some commonly used types