↑ 5.7 Unit testing (functions)

Students:
Section 5.8 is a part of 1 assignment: **CSC108 CH05.8-5.16 P5B**

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Includes: PA
Due: 04/15/2025, 11:59 PM EDT

5.8 How functions work

Each function call creates a new set of local variables, forming part of what is known as a ***stack frame***. A return causes those local variables to be discarded.

PARTICIPATION ACTIVITY 5.8.1: Function calls and returns.

Start 2x speed

```
int FtInToIn(int inFeet, int inInches) {
   int totInches;
   ...
   return totInches;
}

double FtInToCm(int inFeet, int inInches) {
   int totIn;
   double totCm;
   ...
   totIn = FtInToIn(inFeet, inInches);
   ...
   return totCm;
}

int main() {
   int userFt;
   int userIn;
   int userCm;
   ...
   userCm = FtInToCm(userFt, userIn);
   ...
   return 0;
}
```

Captions

Feedback?

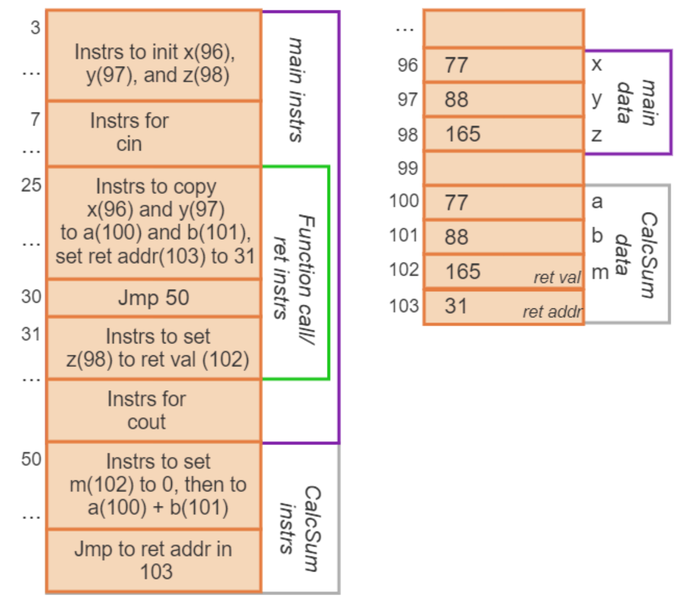
Some knowledge of how a function call and return works at the assembly level can not only satisfy curiosity, but can also lead to fewer mistakes when parameter and return items become more complex. The following animation illustrates by showing, for a function named CalcSum(), some sample high-level code, compiler-generated assembly instructions in memory, and data in memory during runtime. This animation presents advanced material intended to provide insight and appreciation for how a function call and return works.

The compiler generates instructions to copy arguments to parameter local variables, and to store a return address. A jump instruction jumps from main to the function's instructions. The function executes and stores results in a designated return value location. When the function completes, an instruction jumps back to the caller's location using the previously-stored return address. Then, an instruction copies the function's return value to the appropriate variable.

PARTICIPATION ACTIVITY 5.8.2: How function call/return works.

Start

```
#include <iostream>
using namespace std;

int CalcSum(int a, int b) {
  int m;

  m = 0;
  m = a + b;
  return m;
}

int main() {
  int x;
  int y;
  int z;

  x = 0;
  y = 0;
  z = 0;
  cin >> x;
  cin >> y;
  z = CalcSum(x,y);

  cout << z << "\n";
  return 0;
}
```



Captions

Feedback?

PARTICIPATION ACTIVITY 5.8.3: How functions work.

1) After a function returns, its local variables keep their values, which serve as their initial values the next time the function is called.
   - True
   - False

2) A return address indicates the value returned by the function.
   - True
   - False

Feedback?

How was this section? Provide section feedback

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Completion details

↓ 5.9 Functions: Common errors