

C++ Functions

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- Writing a **swap** function
 - If we want to swap the values **a** and **b**, we need an intermediate value to hold the value as a transition
- C++ offers an alternative parameter-passing method called pass-by-reference (using the **&** operator)
- When we pass by reference, the data being passed is the address of the argument, not the argument itself
- Memory Layout
 - Text: Program code
 - Data: Global variables
 - BSS: Global and static variables
 - Stack: Local variables
 - Heap: Dynamic memory
- When is memory allocated?
 - Global and static: Upon program start
 - Local variables: Upon function call
 - Dynamic memory: **new** keyword call (C++)
- Stack
 - Memory for C/C++ run-time system to keep track of active functions
 - * Stack pointer (SP)
- Dynamic Memory Allocation
 - Operator **new** is used to request memory space enough to hold a specific data type or an array of the data type
- **struct** is much like an array
 - The structure stores multiple data
 - * You can access the individual data, or you can reference the entire structure
 - To access a particular member, you use the **.** operator
 - * As in **student.firstName** or **p1.x**
 - We will see later that we will also use **->** to reference a field if the **struct** is pointed to by a pointer

- We may pass **structs** as parameters
- The parameter would be entered as **struct** <tag> <name>
- Passing a struct by value has two flaws:
 - * Twice as much memory is required
 - * It requires copying each member of temp back into the members of the original **struct**
 - * A pointer may be used instead