

CS 152
Computer Programming
Fundamentals
Program Organization

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High Level View of a Program

- Data – numbers, words, pictures, databases, . . .
- Instructions – What should the program do with the data?

Data

- Variable – named location in memory
- Type – the sort of data a variable can hold (int, double, String, ...)
- Literal – The actual hardcoded values typed in your code (42, 3.14159, "Hello World")

Program is a sequence of instructions

- A sequence of instructions with no choices is not very complicated.
- More complex behaviour is created with *control structures*.
 - Branches – Choose course based on a test
 - Loops – Repeat a sequence of instructions

Break down large programs into smaller chunks

- Could write entire program as one large sequence of instructions, but this gets unwieldy.
- Group together a sequence of instructions and give it a name. This is a *method* (aka subroutine, function, procedure)
- Java Libraries provide methods for many useful tasks (Math, Input/Output, GUI display)

Advantages of methods

- Saves typing. Single statement method call is much shorter than duplicating complex code every time.
- Organizes thoughts. Easier to understand separate methods for separate tasks.
- Don't have to think about what happens inside. Can call a subroutine without needed to know implementation details.

Additional Java Organization

In addition to methods, Java has a couple higher level ways to group code.

- Classes – contain variables and methods that are related to each other. Existing classes in Java include Math, String, System
- Packages – Organizes classes in a directory structure.