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.