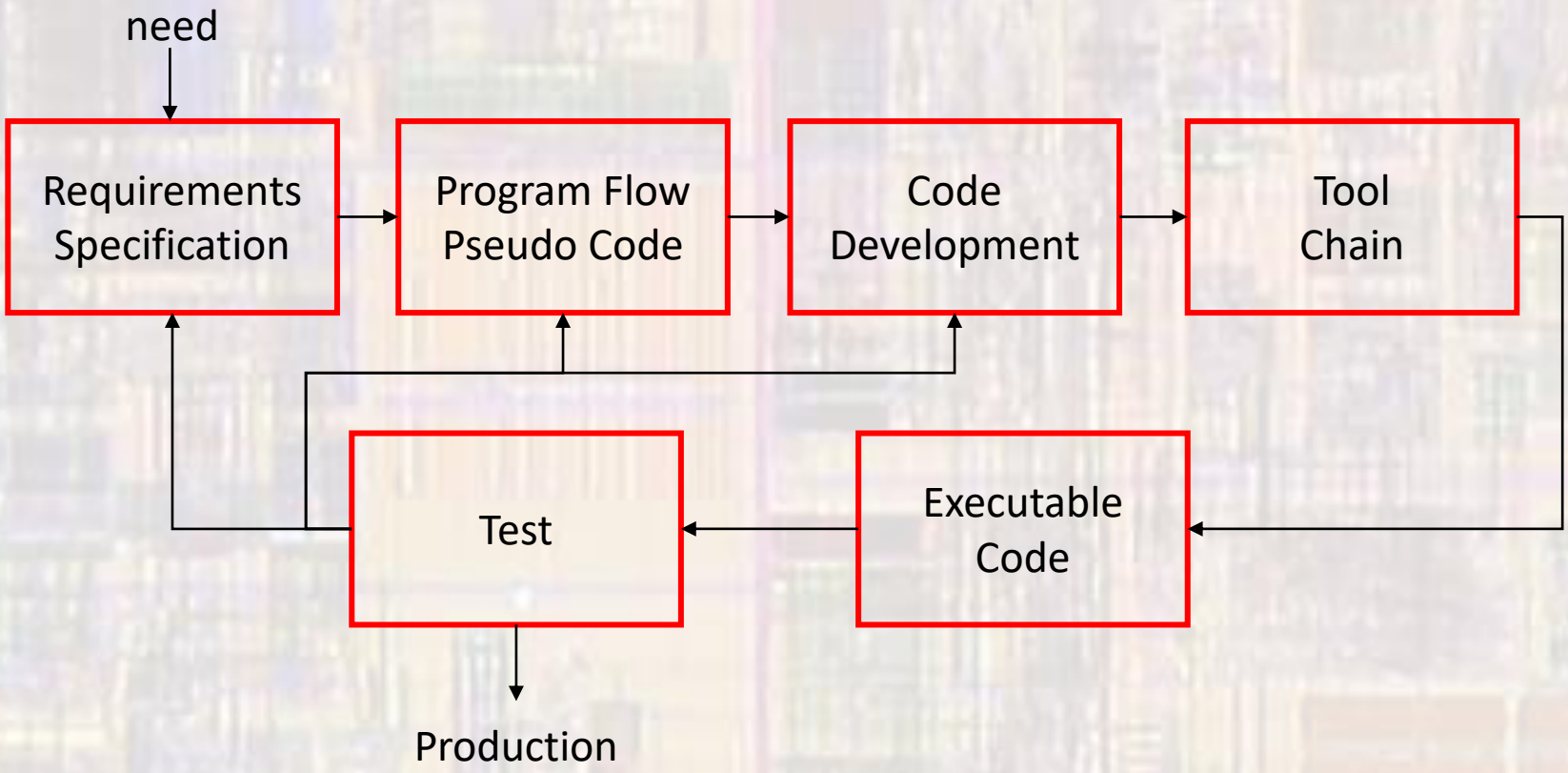
# Tool Chain

Last updated 6/30/21

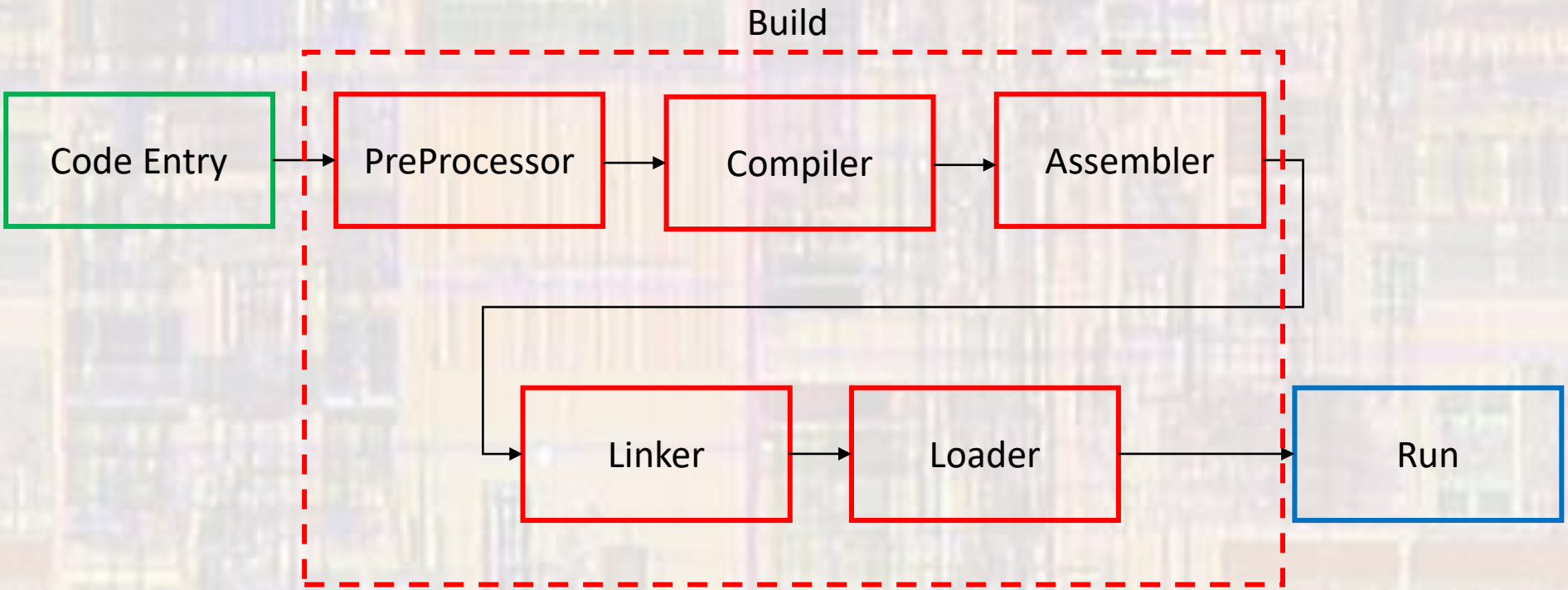
# Tool Chain

- Development process



# Tool Chain

- Tool Chain



# Tool Chain

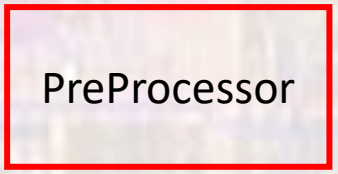
- Code Entry


  - filename.c or .cpp
  - Text editor
  - Integrated Development Environment
    - Code Composer
    - Eclipse

# Tool Chain

- Preprocessor

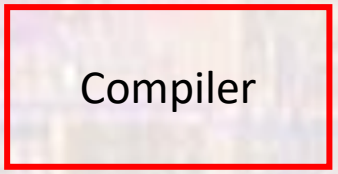



  - Deals with any commands starting with #

  - Tells the tool chain to include additional libraries
  - Replaces any “defines” throughout the code
  - Expands macros throughout the code
  - Manages any conditional defines

# Tool Chain

- Compiler



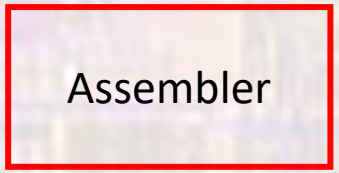

  - Converts c-code to assembly language

  - Assembly language
    - Architecture specific programming language
    - Direct access to specific registers, commands, memory

```
ldi R2, 5;          // load register R2 with the value 5
sts R2, 0x0200;     // copy the value in R2 to mem location 0x0200
add R2, R1;         // add the values of R2 and R1 and store in R2
```

# Tool Chain

- Assembler



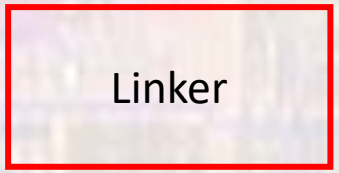

  - Converts assembly language to machine language
  - Result is an object file (file.o)

  - Machine language
    - Part specific programming language
    - Binary representation that the processor understands

```
1001 1000 1010 1101      // load register R2 with the value 5
1100 1011 1001 1100      // copy R2 to mem location 0x200
1100 1010 1100 0011      // add R2, R1 and store in R2
```

# Tool Chain

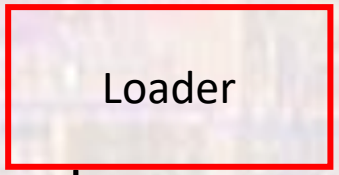
- Linker




  - Combines the machine language code from your program with all included libraries
  - Configures all the code in memory
    - Aligns code segments
    - Makes connections where necessary (function calls)
    - Assigns variables spots in memory
  - Creates an executable file - file.out (file.exe for windows systems)

# Tool Chain

- Loader (programmer)




  - Creates whatever environment is necessary on the executing machine
  - Loads the executable program
  - Starts the program