Hands-On I: Hello worlds
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Live Walkthrough of Online Resources
"Hello World" in Chapel: Two Versions

- Fast prototyping

```chapel
writeln("Hello, world!");
```

- “Production-grade”

```chapel
module Hello {

    proc main() {
        writeln("Hello, world!");
    }
}
```
"Hello World" in Chapel: Two Versions

- Fast prototyping (configurable)
  ```chapel
  config const audience = "world";
  writeln("Hello, ", audience, "!");
  ```

- “Production-grade” (configurable)
  ```chapel
  module Hello {
    config const audience = "world";

    proc main() {
      writeln("Hello, ", audience, "!");
    }
  }
  ```

- To change ‘audience’ for a given run:
  - ./hello --audience=ACCU2017
Steps to “Hello World”

● Point web browser to online resources

● Download and build Chapel
  ● most find it nicest to start with a familiar machine…
  ● can also get a Cray account and use a pre-installed version

● Create hello.chpl with your favorite editor:
  ● writeln("Hello, world! ");

● Compile it
  ● chpl -o hello hello.chpl

● Run it
  ● ./hello
Check out other “Hello world” versions

- Take a look at $CHPL_HOME/examples/hello*.chpl
  - Six variations that show off different language features
  - Also rendered online at: http://chapel.cray.com/docs/latest/examples/

- Do whatever else you can / want before the morning break
  - Additional examples can be found in $CHPL_HOME/examples
    - primers/ introductions to various language concepts
    - benchmarks/ some standard benchmarks written in Chapel
  - Primer examples also online:

- After the break:
  - Base language
  - Data parallelism
  - More hands-on
  - Task Parallelism, Locality, …
Optional Compiler Architecture Sidebar
Compiling Chapel

Chapel Source Code → chpl → Standard Modules (in Chapel) → ChapelExecutable
Chapel Compiler Architecture

- Chapel Source Code
  - Chapel-to-C Compiler
  - Generated C Code
  - Standard C Compiler & Linker
    - Standard Modules (in Chapel)
    - Internal Modules (in Chapel)
    - Runtime Support Library (in C)
      - Tasks/Threads
      - Communication
      - Memory
      - ...

- Chapel Executable

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LLVM back-end

- Chapel typically code-generates C
- Targeting LLVM is also an option
  - Not on by default due to build-time required
- To enable:
  - set CHPL_LLVM=llvm and re-'make'
  - compile with 'chpl --llvm' (or set CHPL_LLVM_CODEGEN)
- Enabling LLVM also supports an interoperability capability

```c
extern {
    void myCFunc() {
        // myCFunc() can be called from Chapel
        printf("Hello from C!");
    }

    #include "gsl.h" // as can functions defined in gsl.h…
}
```
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