CS480
Translators

Introduction to Compilers
Milestone I - gforth
Your First Milestone

• Learn a new language, *gforth*
• Get a Makefile working
• Write a Milestone report
Why learn a new language?

- Different language paradigms
- This is our target code
What is Forth?

• Imperative
• Stack-based
• Postfix (Reverse Polish Notation)
  1 + 2 * 3
  1 2 3 * +

• How about 3 / 1 + 4 * 2?
Gforth

• How does it work?
  – Command Line
  – Files
Old Desk Calculators

```
flip3 ~/cs480_files 68% dc
1
2
+
p
3
1 2 +
p
3
p
p
p
dc: stack empty
quit
flip3 ~/cs480_files 69% 
```

Connected to flop.engr.oregonstate.edu
SSH2 - aes128-cbc - hmac-md5 - nc | 47x17
Starting/Using Gforth

```
flip3 ~/cs480_files 58% gforth
Gforth 0.7.0, Copyright (C) 1995-2008 Free Software
Foundation, Inc.
Gforth comes with ABSOLUTELY NO WARRANTY; for details type `license' 
Type `bye' to exit 
3 1 / 4 2 * + ok 
.11 ok
1  ok
2  ok
3  ok
*  ok
+  ok
.s <1> 7  ok
s" Hello everyone"  ok
.s <3> 7 32538112 14  ok
bye
```
Makefile Example

• Four Targets
  – compile
  – clean
  – stutest.out
  – proftest.out
Example stutest.out

Exercise 1:
printf('Hello World\n');
Hello World

Exercise 2:
15 * 3 + 4 - 10 / 2 - 7
37

Exercise 3:
15.0 * 3.0 + 4.0 - 10.0 / 2.0 - 7.0
37.

Exercise 4:
15.0e0 * 3.0e0 + 4.0e0 - 10.0e0 / 2.0e0 - 7.0e0
37.

Exercise 5:
15 * 3.0e0 + 4.0e0 - 10 / 2.0e0 - 7
37.

Exercise 6:
y = 15;
x = 3.0e0;
y * x + 4.0e0 - 10 / 2 - 7
37.
Milestone Report

Handwritten Answers to Milestone Questions:

Specification (what do you think the purpose of this milestone is)

Processing (how did you and/or your team go about solving the problem)

Testing Requirement (how did you and/or your team test for correctness)

Retrospective (what did you learn in this milestone)

Team Evaluation (what is the percentage of time contributed by each team member)
Milestone Grading

• Compiles, cleans, and produces stutest.out  
  – 50%

• Testing: completeness of coverage  
  – 25%

• Milestone report  
  – 25%
Quiz #1 Questions

• Form groups of 3 - 4.
• Think about string representation.
• What are the different choices? (Examples)
• What representation does gforth use?
• What is the tradeoff between these choices?