



WRITING SIMPLE PROGRAMS

CSSE 120—Rose-Hulman Institute of Technology



Show Off Some Animations

- Who would like me to show off their work?
- Otherwise I'll pick some programs at random



Setting Up IDLE Shortcut

- Verify IDLE shortcut:
 - ▣ Launch IDLE
(Start → All Programs → Python 2.5 → IDLE)
 - ▣ In IDLE, choose File → Open...
 - ▣ What directory does the “Open Dialog” start in?
 - CSSE 120? Excellent, help a neighbor in need
 - Python25? Follow the link in the Schedule details
 - <http://www.rose-hulman.edu/class/csse/resources/Python/installation.htm>
 - Follow step 4



The Python Interpreter

- What it does:
 - ▣ Takes in Python commands
 - ▣ Converts them to 0s and 1s for the “CPU”
 - ▣ Gets answer back from “CPU”
- How we’ll use it:
 - ▣ IDLE’s Python *shell*—lets us “talk with” the interpreter
 - ▣ `>>>` is a Python *prompt*



Sequences of Statements

□ *Functions*

- Named sequences of statements
- Can *invoke* them—make them run
- Can take *parameters*—changeable parts



Parts of a Function Definition

```
>>> def hello():  
    print "Hello"  
    print "I'd like to complain about this parrot"
```

*Defining a function
called "hello"*

Indenting tells interpreter
that these lines are part of
the hello function

Blank line tells interpreter
that we're done defining
the hello function



Defining vs. Invoking

- Defining a function says what the function should do
- Invoking a function makes that happen
 - ▣ Parentheses tell interpreter to invoke the function

```
>>> hello()
```

```
Hello
```

```
I'd like to complain about this parrot
```

- ▣ Later we'll define functions with parameters



Saving Programs

- Annoying to keep retyping
- Can save definitions in separate files
 - ▣ Call *modules* or *scripts*
 - ▣ In IDLE, use File → New Window
- Can edit with plain old text editor (like Notepad)
- Can use a *programming environment*
 - ▣ Recognizes what you type
 - ▣ Tries to help
 - ▣ Examples: IDLE, Eclipse



Running Programs

- Like typing in all the lines, but easier
- One way: Open file in IDLE and run it
 - ▣ File → Open...
 - ▣ Select the file
 - ▣ Run → Run Module
- Another way: type `import <module>` at prompt
 - ▣ Replace `<module>` with name of module
 - ▣ Don't type the ".py"
 - ▣ Example: `import chaos`



Your .pyc is in my directory!

- A partially translated version of your file
- Called *byte code*
- Interpreter saves this to make loading faster
- Try double-clicking it!

Breaking Down Chaos

comments

```
# A simple program illustrating chaotic behavior.  
# From Zelle, 1.6
```

```
def main():
```

Define a function called "main"

```
    print "This program shows a chaotic function"
```

```
    x = input("Enter a number: ")
```

An *input statement*

```
    for i in range(10):
```

A *loop*

```
        x = 3.9 * x * (1 - x)  
        print x
```

The loop's *body*

```
main()
```

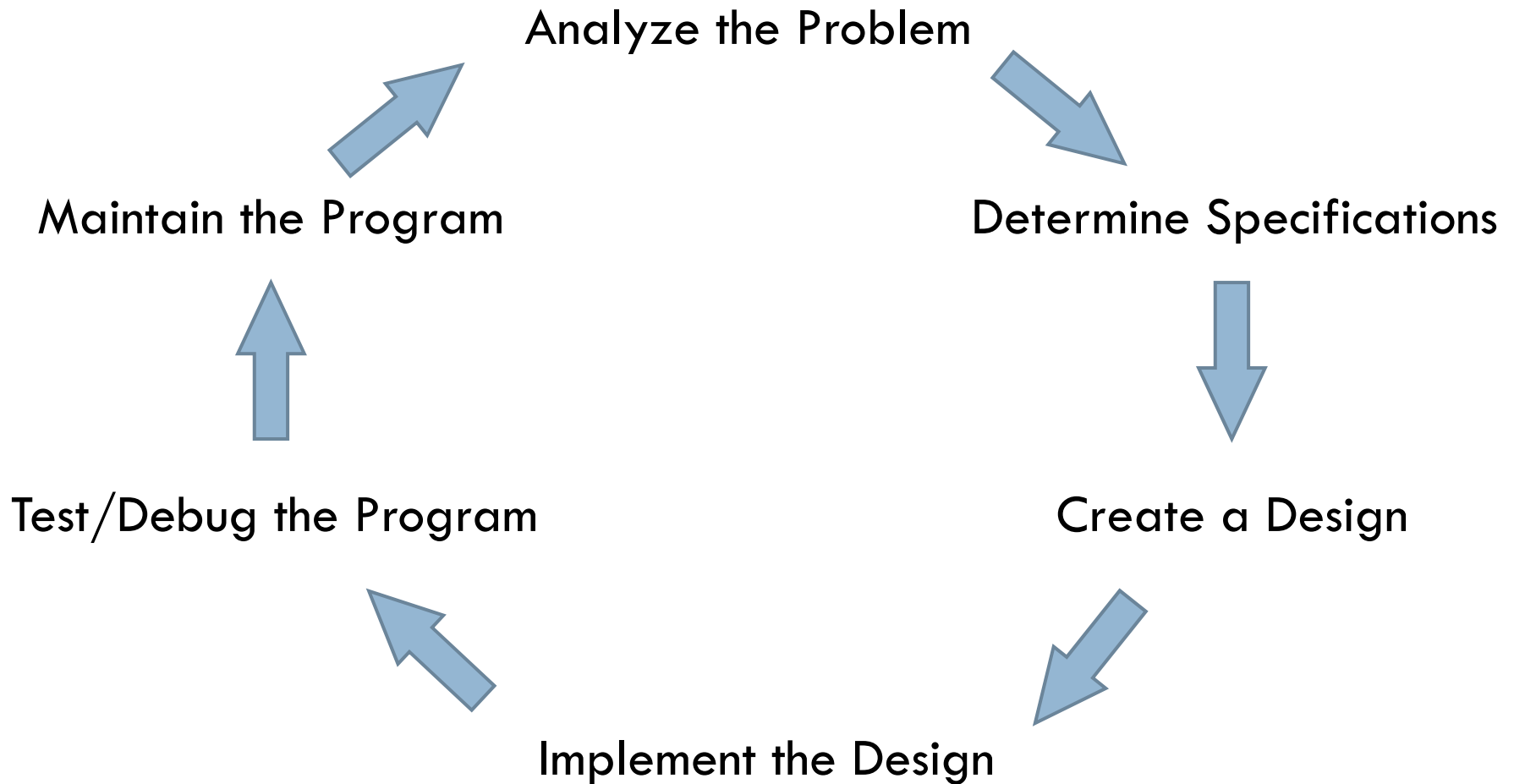
Invoke function main

A *variable* called x

Assignment statement



The Software Development Process



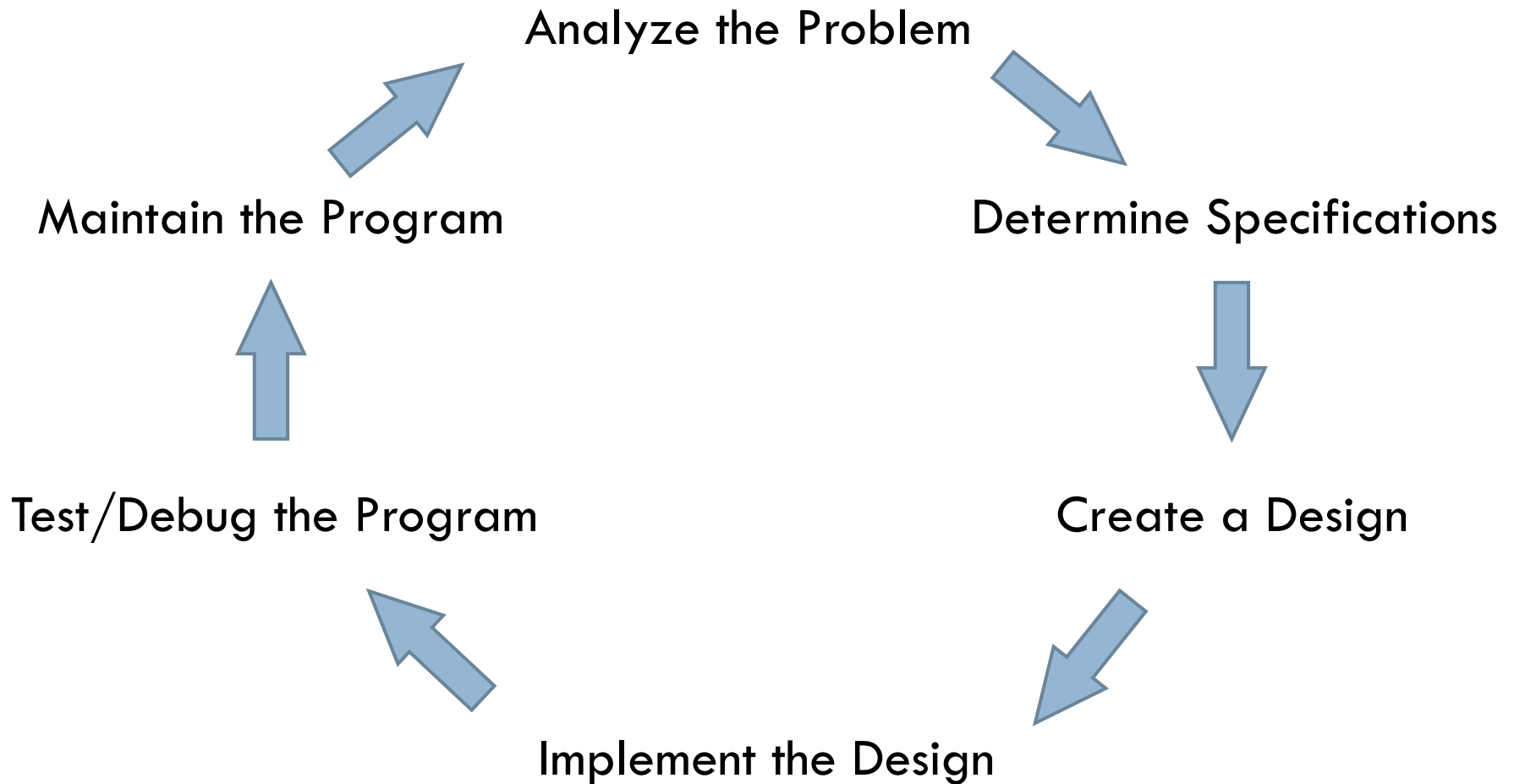


Road Trip!





The Software Development Process





Identifiers: Names in Programs

- Uses of *identifiers* so far...
 - Modules
 - Functions
 - Variables
- Rules for identifiers in Python
 - Start with a letter or `_` (the “underscore character”)
 - Followed by any sequence of letters, numbers, or `_`
- Case matters! `spam` \neq `Spam` \neq `sPam` \neq `SPAM`
- Choose descriptive names!



Reserved Words

- Built-in names
- Can't use as regular identifiers
- Python reserved words:

and	del	for	is	raise
assert	elif	from	lambda	return
break	else	global	not	try
class	except	if	or	while
continue	exec	import	pass	with
def	finally	in	print	yield



Expressions

- Fragments of code that produce or calculate new data values
- Examples
 - *Literals*: indicate a specific value
 - *Identifiers*: evaluate to their assigned value
 - *Compound* expressions using *operators*: $+$, $-$, $*$, $/$, $**$
- Can use parentheses to group

Programming Languages

- Have precise rules for:
 - Syntax (form)
 - Semantics (meaning)
- Computer scientists use *meta-languages* to describe these rules
- Example...

Output Statements

- Syntax:

- print

- print <expr>

- print <expr>, <expr>, ..., <expr>

- print <expr>, <expr>, ..., <expr>,

A “slot” to be filled with any expression

Repeat indefinitely

- Semantics?

Note: trailing comma

- Is this allowed?

- print “The answer is:”, 7 * 3 * 2

Homework

- Hand in Quiz
- On Angel
 - ▣ Lesson → Homework → Homework 2 → Homework 2 Instructions
 - ▣ (or just follow link from Schedule page, that's what I do)