

## Objectives

- Wrap-up functions
- Lab 5

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## Program Using Functions

```
def main():
    print
    print "This program converts binary numbers to decimal numbers."
    print

    binary_string = raw_input("Enter a number in binary: ")

    while not isBinary(binary_string):
        print "Sorry, that is not a binary string"
        binary_string = raw_input("Enter a number in binary: ")

    print "The decimal value is", binaryToDecimal(binary_string)
```

Could we write this  
without functions?

Presents overview of what program does (hides details)

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## Pre/Post Conditions

# pre: binary\_string is a string that contains only 0s and 1s  
# post: returns the decimal value for the binary string

```
def binaryToInt( binary_string ):
    # Alternatively, could do isBinary check here too,
    # but, what would you return in that case?
    exponent = len(binary_string)-1
    dec_value = 0

    for bit in binary_string:
        bit = int(bit)
        # print bit, "2^%d" % exponent
        dec_value += bit * (2 ** exponent)
        exponent -= 1
    return dec_value
```

Commented out  
print statement  
(No side effects)

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## Variable Scope

- Know "lifetime" of variable
  - Only during execution of function
  - Related to idea of "scope"
- What about variables outside of functions?
  - Can get tricky, as I demonstrated yesterday
  - Example: `non_function_vars.py`

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## Debugging Advice

- Build up your program in steps
  - Always write only small pieces of code
  - Test, debug. Repeat
- Write function body as part of main, test
  - Then, separate out into its own function
- Test function separately from other code
  - Comment out irrelevant code to make sure that the function behaves as expected

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## Lab 4 Feedback

- Alternatives to iterate through strings

```
for ch in s :
    print ch
for x in xrange(len(s)) :
    print s[x]
```
- Removing spaces
  - String method: `replace(old, new[, count])`
  - Use: `s.replace(' ', '')`

String to  
replace

String to  
replace with

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## Lab 4 Feedback

- Most efficient solution to determine if palindrome:

```
for x in xrange(len(string)/2):  
    if str[-x-1] != str[x]:  
        return False  
return True
```

- Design decision: What should be part of the isPalindrome function?
  - Lower casing and removal of spaces?

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## Lab 5

- Finish up problem from last lab
  - [Directions in the lab](#)
- Practice writing and using your own functions
- Practice writing your own modules

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