Review for Final Exam

CS 8: Introduction to Computer Science
Lecture #17

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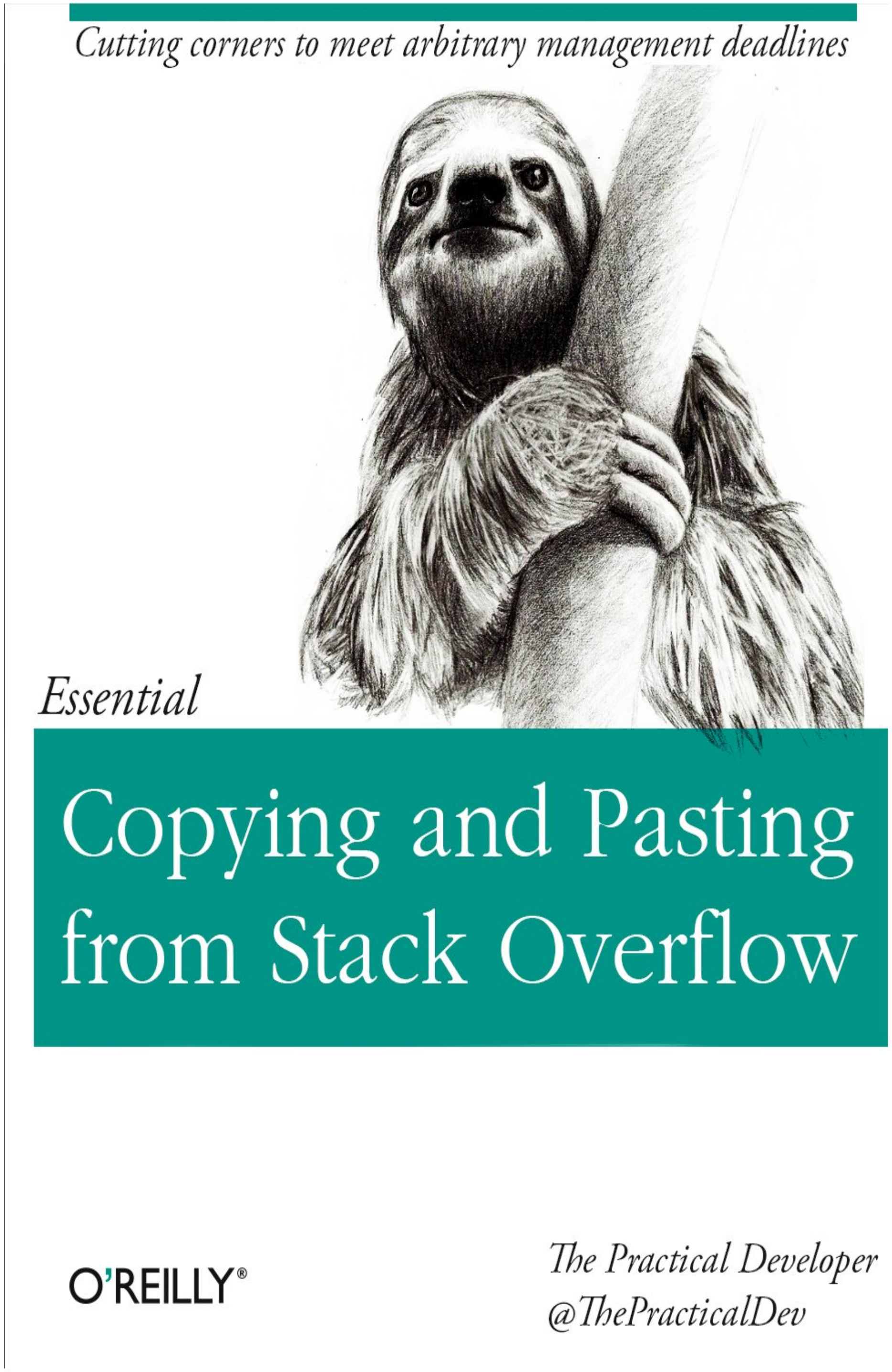


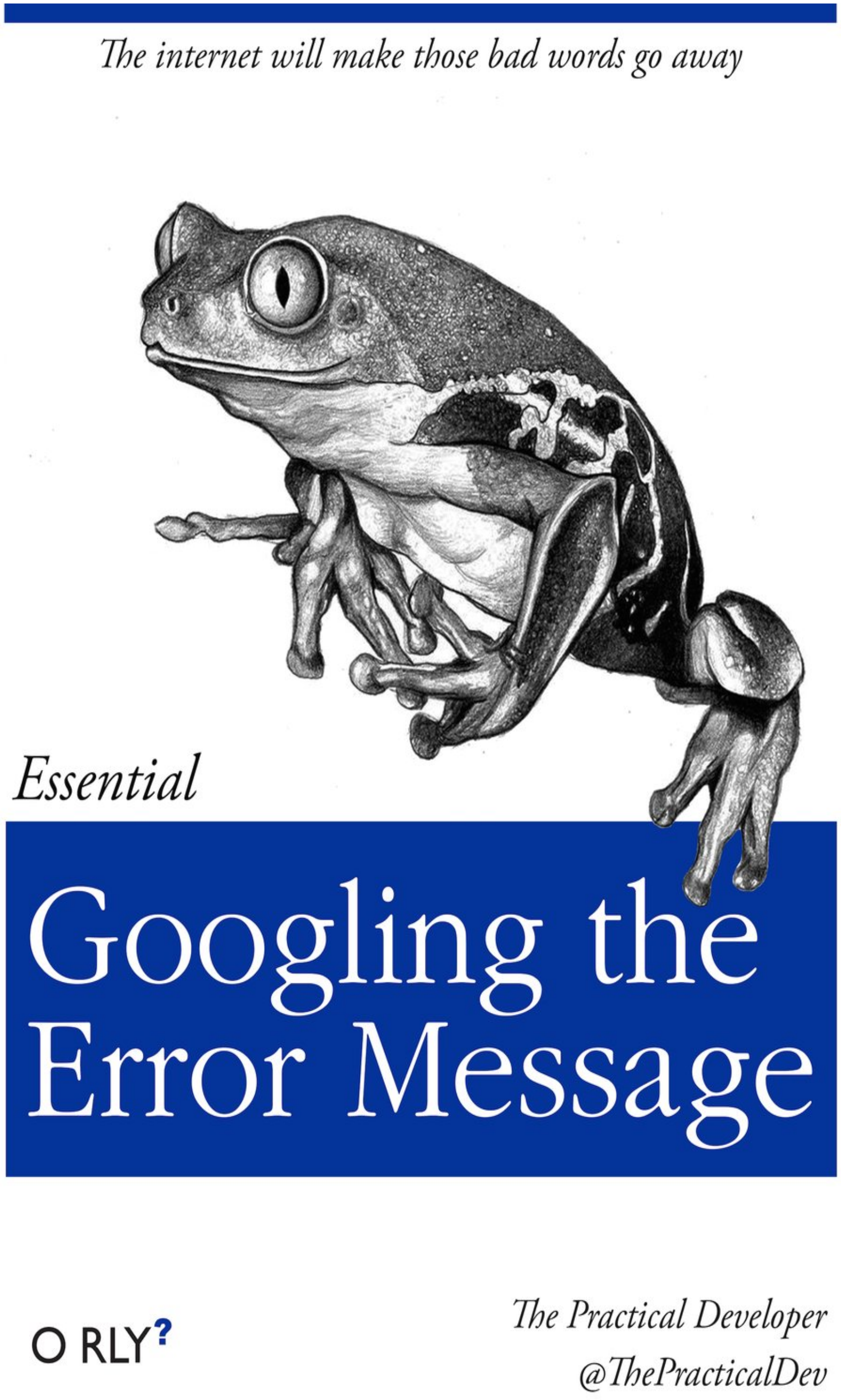
Cutting corners to meet arbitrary management deadlines

Essential

Copying and Pasting from Stack Overflow

O'REILLY®

The Practical Developer
@ThePracticalDev



The internet will make those bad words go away

Essential

Googling the Error Message

O RLY?

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FINAL IS COMING!

- Material: ***Everything*!**
- Homework, Labs, Lectures, Textbook
- **Thursday, 6/15** in this classroom
- **Starts at 4:00pm **SHARP****
- **Seating will be assigned for you!**
  - ***BRING YOUR UCSB IDs PLEASE!***
    Arrive 10-15 minutes early
- Duration: **3 hours long** (but really designed for 1.5 – 2 hours)
- Closed book: no calculators, no phones, no computers
- Only 1 sheet (***double***-sided is ok) of written notes
  - Must be no bigger than 8.5” x 11”
  - You have to turn it in with the exam
- **You will write your answers on the exam sheet itself.**

Optional Review Sessions

- Review sessions on Friday with T.A. Sourav
  - Two times offered: both will have same material
  - See announcements on Piazza for details

- Study Day on Tuesday, 6/13
  - Study with your friends
  - T.As will be there too to help answer questions
  - See announcement on Piazza for details

- T.A.s will also be around next week for your questions
  - Again… it's on Piazza! ☺

Intro Stuff and For-Loops
Lectures 2 – 5 (Ch. 1 & 2)

- What is CS? What are computers? Brief history
- What is programming? How does abstraction fit in?

- Representing Numbers and Using Arithmetic in Python
- Variables in Python
- Random Number Generation

- Loops using **`for`**
  - Differences between **`for n in (…)`** vs. **`for n in range(…)`**
  - Different uses of **`range`**
  - Implementing accumulations **`(example: sum = sum + n)`**

If-Else, Booleans, and Functions
Lectures 2 – 5 (Ch. 1 & 2)

- Conditional statements using **`if/elif/else`**

- Compound Boolean Logic
  - Example: What is `((a > c-d) or (b/c > a)) and (d > 1)`

- Functions – how to define them, how to call them
  - The difference between **`print()`** and **`return`**

Strings
Lectures 6 – 7 (Ch. 3)

- Operations on strings:
  Concatenation, Repetition, Indexing, **`len( )`**

- Member functions
  (e.g. **`string.center`**, .**`count`**, .**`lower`**, .**`index`**, .**`find`**, etc…)

- ASCII conventions (and functions **`chr(n)`** and **`ord(c)`**)

Lists
Lectures 8 – 9 (Ch. 4)

- Lists and their member functions
  (e.g.: **`.append`**, **`.insert`**, **`.pop`**, **`.sort`**, etc..)

- Lists operations
  (e.g.: **`max`**, **`min`**, **`len`**, **`sum`**, creating lists of lists, etc..)

- Review the average, max/min, median algorithms

Dictionaries
Lectures 9 – 10 (Ch. 4)

- Differences between dictionaries, tuples, and lists
- Member functions `.keys` and `.values`
- Operations on dictionaries
  - How do you create an **new** entry with a **key**?
  - How do you assign a **value** to a **key** entry?
- Review frequency counting examples we did using dictionaries
  - Modes and histograms example

File Input/Output
Lectures 10 – 11 (Ch. 5)

- Why use file I/O?
- Opening and closing files
- Using for-loops to read a file
- Differences between **`readline`**, **`readlines`**, and **`read`**
- Reading HTML files over the Internet using **`urllib.request`**

Formatting Output Lines
Lectures 11, 14

- Using the **`input()`** function
  - What does that data type default to?
  - How do we force an input to be a non-default type?

- Using the **`print()`** function
  - How does the “**`,`**” operator work in there?
  - How does the “**`end=`**” option work?

- Converting one data type into another data type
  - Example: `x = str(66)` or `y = int(“54”)`

- Format modifiers using the “**`%`**”method
- Format modifiers using the **`.format`** method

While Loops, Control Structures, Digital Images

Lecture 13 – 14 (Ch. 5, 6)

- Differences between **while** and **for** loops
- Ability to write the same loop in either fashion

- High-level control structures
  - Flow charts
  - What they tell us about how to best plan writing a program
  - No programming questions on this topic

- Differences between Raster vs. Vector graphics
- The RGB scheme and how it works in Python's **`cImage`** module using the Pixel class
  - No programming questions on this topic
  - And that's all you need to know on this topic…

Recursive Functions and Classes/Objects

Lecture 15 – 16 (Ch. 9, 10)

- How to write/interpret a recursive function
  - What are the 2 things you need to know to do recursion function programming?
  - If I give you a numerical sequence, make that into a recursive function.
  - Or if I show you a recursive function, tell me what it does

- Classes and Objects
  - Definitions and examples of how they are used in Python
  - No programming questions on this topic

Recursion in Poetry!

A child couldn't sleep, so her mother told a story about a little frog,
who couldn't sleep, so the frog's mother told a story about a little bear,
who couldn't sleep, so bear's mother told a story about a little weasel
...who fell asleep.
...and the little bear fell asleep;
...and the little frog fell asleep;
...and the child fell asleep.

Chapter	Sections	Topic(s)
1 and 2	All	Introduction to: • programming, CS, • numbers and variables, • **for** loops, accumulations, • the **math** library, **random** numbers, • **if-else** statements
3	All	Strings, including Standard Inputs
4	All	Lists and Dictionaries
5	All	Computer file I/O Online file access (input) While loops
6	1 – 2	Image Processing
9	1 – 3	Recursive functions
10	1 – 2	Classes

Homework, Labs, and Projects

- Review them ALL

  and understand what you did

Sample Questions

What does this Python code print out?

```
n = 10
while (n > 4):
    print (n, end=“.”)
    n -= 1                # what is this?
```

10.9.8.7.6.5.

What does this Python code print out?

```
j = 1
while (j <= 5):
    print (j*5)
    j = j + 3          # can I write line this another way?
```

5
20

Re-write this code using only a for loop

Sample Questions

What does this Python code print out?

```
L = []
ct = 0
while (ct < 4):
    L.append(2*ct-ct/2)
    ct+=1
Print (L)
```

[0.0, 1.5, 3.0, 4.5]

What does this Python code print out?

```
k = 8
while (k < 10):
    print(“While away!")
    for k in range(5, 13, 2):
        if (k == 7):
            print (“Lucky Seven!\n”)
        else:
            print (k)
```

While away!
5
Lucky Seven!

9
11

Sample Questions

What does this Python program print out?

11,12,13,

```
n = 1
m = 10
while (n < 12) or (m > 4):
    print(n + m, end=“,”)
    n += 5
    m -= 4
```

How different would the answer be if we changed the “or” into “and”?

11,12,

Sample Questions

Write a Python function, **CollectNamesAges()**, that asks users to input names of people AND their ages that it will put in a dictionary *that it returns*. Users will be continually asked for names until they enter "END". Ages must be stored as integer variables.

For example:

```
Please enter a name: Jim
Please enter age for Jim: 30
Please enter a name: END
```

When they do so, the function will *also print out* the dictionary. The string "END" must not be placed in the dictionary.

Answer to Previous Question

```
def CollectNamesAges():
    D = {}
    name = ""
    while (name != "END"):
        name = input("Please enter a name: ")
        if name != "END":
            age = int(
                   input("Please enter age for " + name + ": ") )
            D[name] = age

    print (D)
    return D
```

Sample Questions

What does this Python program print out?

```
def Converter(dnary):
    newd = {}
    alist = (dnary.values())
    for item in alist:
        newd[item] = str((item-1)*2)
    return newd

Yums = {'crepe': 3, 'pho': 9, 'tabbouli': 10,
'roti': 9, 'guotie': 5}

print( Converter(Yums) )
```

{3: '4', 9: '16', 10: '18', 5: '8'}

Sample Questions

Write a **recursive** function in Python, **Sum(n)**, where **n** is a positive integer. The function returns the sum of the first **n** integers.

```
def Sum(n):
   if n == 0:
       return 0
   else:          # else: in this example is optional
       return n + Sum(n – 1)
```

More Sample Questions

… Will be made available in review sessions run by the T.As

Watch for announcements on Piazza

</CS8>

Best of Luck on All of Your Finals

Have an Awesome Summer!