Compsci 101
7-steps, Functions, Order of Execution
Live Lecture

Specification

```
filename: Laundry.py

def minutesNeeded(m):
    """
    Return integer number of minutes
    """
```

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January 28, 2021

Announcements

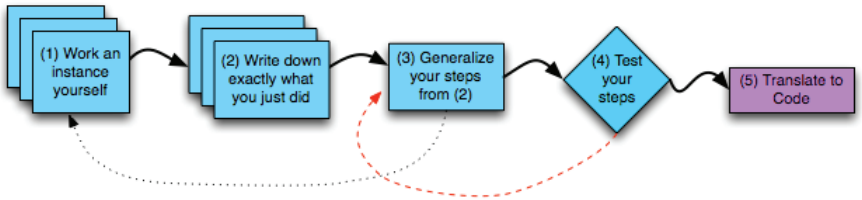
- Lab 01 Friday,
  - Complete Prelab before going to lab
- APT-1 out today, due Thursday, Sept 4
- Reading quizzes due 1:45pm on date
  - Only three tries
  - First two weeks we allow you to submit late, get in soon
- Interested in CS opportunities:
  - Join compsci@duke.edu mailing list
- Read Piazza Every Day – You will learn things!
- Reminder: Piazza back channel

PFTD

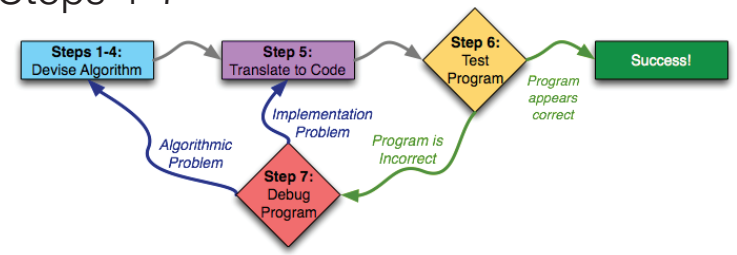
- 7 steps of programming
- Functions
- APTs
- Order of execution
- Testing and Submitting APTs

Seven Steps

Steps 1-4

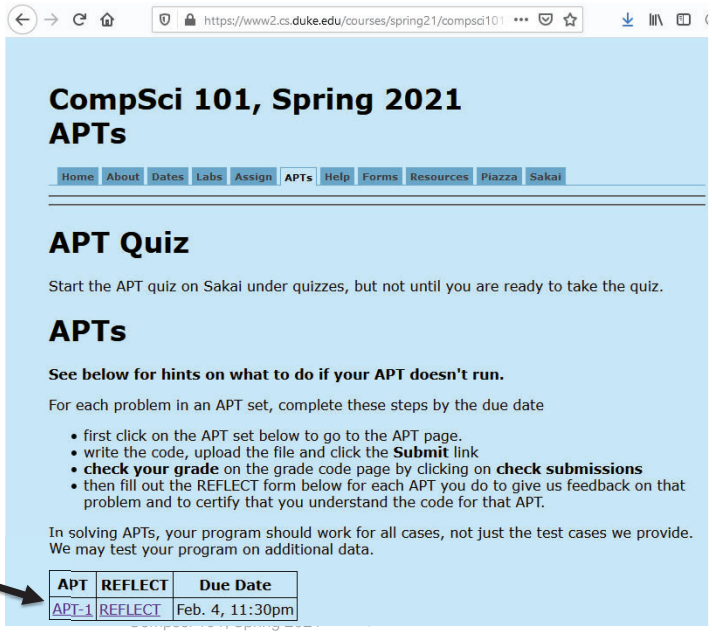


Steps 1-7



Solving Laundry APT

- Navigate to APTs in class website and …



CompSci 101, Spring 2021
APTs

Home | About | Dates | Labs | Assign | APTs | Help | Forms | Resources | Piazza | Sakai

APT Quiz

Start the APT quiz on Sakai under quizzes, but not until you are ready to take the quiz.

APTs

See below for hints on what to do if your APT doesn't run.

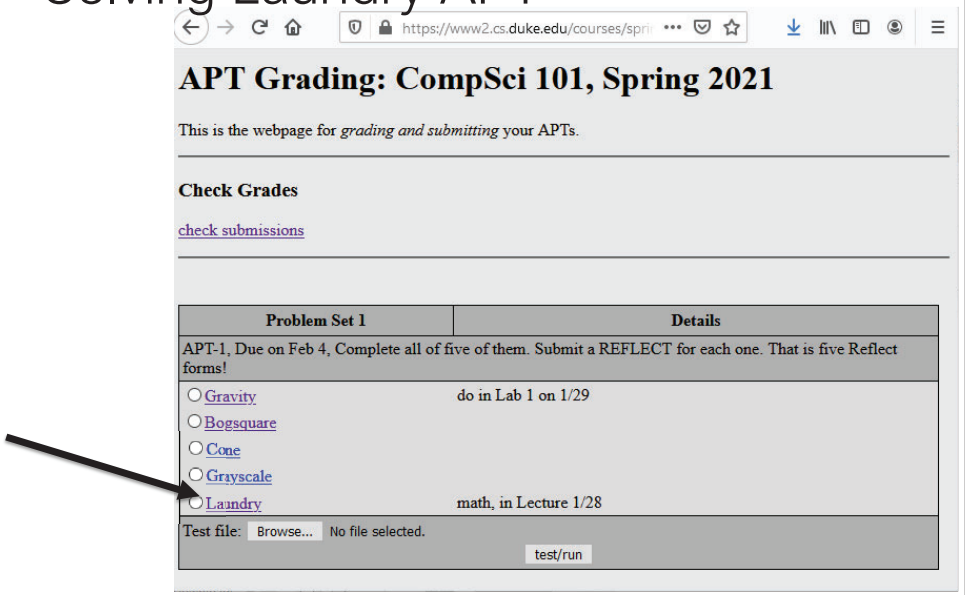
For each problem in an APT set, complete these steps by the due date

- first click on the APT set below to go to the APT page.
- write the code, upload the file and click the **Submit** link
- **check your grade** on the grade code page by clicking on **check submissions**
- then fill out the REFLECT form below for each APT you do to give us feedback on that problem and to certify that you understand the code for that APT.

In solving APTs, your program should work for all cases, not just the test cases we provide. We may test your program on additional data.

APT	REFLECT	Due Date
APT-1	REFLECT	Feb. 4, 11:30pm

Solving Laundry APT



APT Grading: CompSci 101, Spring 2021

This is the webpage for *grading and submitting* your APTs.

Check Grades

check submissions

Problem Set 1	Details
APT-1, Due on Feb 4, Complete all of five of them. Submit a REFLECT for each one. That is five Reflect forms!	
○ Gravity	do in Lab 1 on 1/29
○ Bogsquare	
○ Cone	
○ Grayscale	
○ Laundry	math, in Lecture 1/28
Test file: Browse... No file selected. test/run	

Solving Laundry APT

- Navigate to APTs in class website and …

Problem Statement

Consider the problem of trying to do a number of loads of laundry, given only one washer and one dryer. Washing a load takes 25 minutes, drying a load takes 25 minutes, and folding the clothes in a load takes 10 minutes, for a total of 1 hour per load (assuming that the time to transfer a load is built into the timings given). 10 loads of laundry can be done in 10 hours, 600 minutes, using the method of completing one load before starting the next one. Though it can be done faster, see examples.

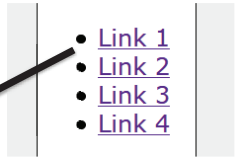
Specification

```
filename: Laundry.py

def minutesNeeded(m):
    """
    Return integer number of minutes to launder m (integer) loads
    """

    # you write code here
```

Write the method, `minutesNeeded`, that returns the shortest time needed to do `m` loads of laundry. In other words, given an integer value representing the number of loads to complete, `m`, determine the smallest number of minutes needed to complete all loads of laundry.

WOTO – Working Together (breakout groups)

- Given a bitly link
  - Type it in OR click on it on the calendar page
  - http://bit.ly/101s21-0128-1



- Link 1
- Link 2
- Link 3
- Link 4

- What you should do:
  - Introduce yourselves
  - Each person fills out google form
  - Put in your name, email and netid
  - Discuss each question and fill out
  - Be mindful of time

Solving Laundry APT – Steps 1 and 2
WOTO: http://bit.ly/101s21-0128-1

- What is important info?

Problem Statement

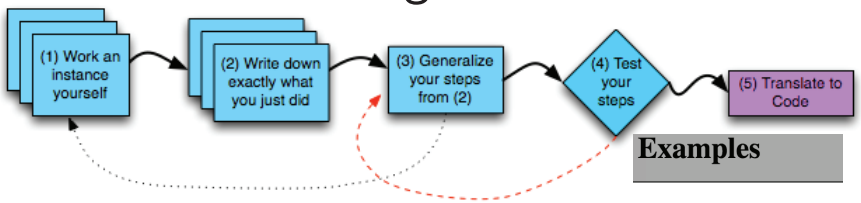
Consider the problem of trying to do a number of loads of laundry, given only one washer and one dryer. Washing a load takes 25 minutes, drying a load takes 25 minutes, and folding the clothes in a load takes 10 minutes, for a total of 1 hour per load (assuming that the time to transfer a load is built into the timings given). 10 loads of laundry can be done in 10 hours, 600 minutes, using the method of completing one load before starting the next one. Though it can be done faster, see examples.

Write the method, `minutesNeeded`, that returns the shortest time needed to do

Specification

```
filename: Laundry.py

def minutesNeeded(m)
    """
    Return integer n
    """

    # you write code
```

Reading an APT



- Step 1: Work an instance yourself
- Step 2: Write down exactly what you just did
- Step 3: Generalize your steps
- Step 4: Test your steps (with new input)

What should be a variable?

Examples

1. `m = 1`

   `returns: 60`

   You must was
   minutes.

2. `m = 2`

   `returns: 85`

Solving Laundry APT – Steps 3 and 4
WOTO: http://bit.ly/101s21-0128-2

- What is important info?

Problem Statement

Consider the problem of trying to do a number of loads of laundry, given only one washer and one dryer. Washing a load takes 25 minutes, drying a load takes 25 minutes, and folding the clothes in a load takes 10 minutes, for a total of 1 hour per load (assuming that the time to transfer a load is built into the timings given). 10 loads of laundry can be done in 10 hours, 600 minutes, using the method of completing one load before starting the next one. Though it can be done faster, see examples.

Write the method, `minutesNeeded`, that returns the shortest time needed to do `m` loa

Specification

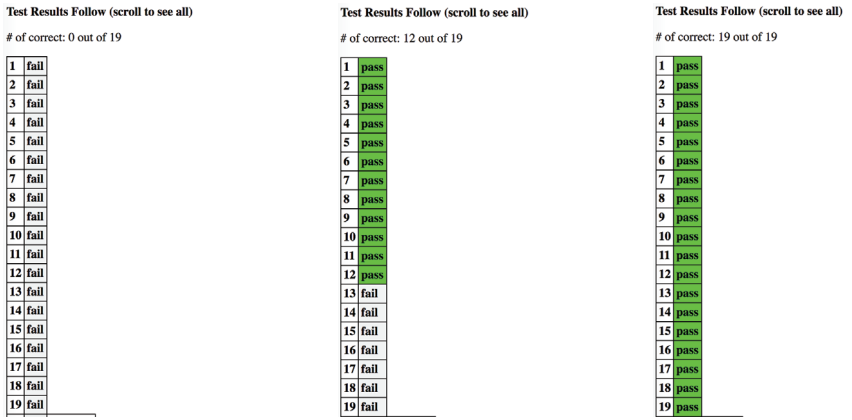
```
filename: Laundry.py

def minutesNeeded(m):
    """
    Return integer numbe
    """

    # you write code her
```

Solving an APT

- Create new project
  - File > New Project
  - Existing interpreter (first project you made from installation)
- Create new Python File
  - Right click on project > New > Python File
- Create function within module
  - Name it properly!

Names and Return 0 Submission

- Take small steps to get all green!



Test Results Follow (scroll to see all)

# of correct: 0 out of 19

1	fail
2	fail
3	fail
4	fail
5	fail
6	fail
7	fail
8	fail
9	fail
10	fail
11	fail
12	fail
13	fail
14	fail
15	fail
16	fail
17	fail
18	fail
19	fail

Test Results Follow (scroll to see all)

# of correct: 12 out of 19

1	pass
2	pass
3	pass
4	pass
5	pass
6	pass
7	pass
8	pass
9	pass
10	pass
11	pass
12	pass
13	fail
14	fail
15	fail
16	fail
17	fail
18	fail
19	fail

Test Results Follow (scroll to see all)

# of correct: 19 out of 19

1	pass
2	pass
3	pass
4	pass
5	pass
6	pass
7	pass
8	pass
9	pass
10	pass
11	pass
12	pass
13	pass
14	pass
15	pass
16	pass
17	pass
18	pass
19	pass

Testing Laundry.minutesNeeded

- The function minutesNeeded is in module Laundry
  - Wrote the function, how to call it?
  - You can test if you provide main!
  - Alternatively, import into console
- In PyDev console
  - Must write `import Laundry`
  - Must call `Laundry.minutesNeeded(2)` for example

Where to put/use what in Python file

- Top: docstring with date and username
- Function definitions right after docstring
- Test code inside `if __name__ == '__main__':`
- Variables inside vs outside a function
  - *Only* use the variables inside that function
  - Therefore, *do not* use the variables outside the function (like in the main)
    - Your code will not work on the server

APT Testing and Submission

- You wrote the code, how is it tested?
  - Submit .py file with function to server
  - Server imports it
  - Server tests and checks by calling your function
- The APT testing framework calls your code!
  - Don't call us, we'll call you: *Hollywood principle*
- Test + Submit, then Reflect
  - Make sure you reflect! See web pages

Understanding Execution

- Using PythonTutor: http://pythontutor.com
  - How are functions defined?
  - Where does execution begin?
  - What is the global frame?
  - What is a local/function frame?

WOTO: Calling Functions
http://bit.ly/101s21-0128-3