48024 Applications Programming

Dr Angela Huo

Zoom Manner

- Chat: Message the lecturer if something is wrong
- Icon: Slow down or faster?
    - When you have a question, click “Raise hand”, I will unmute you and you can speak
    - Vote for a poll, click “Yes” or “No”
- Padlet: https://padlet.com/angelahuo/appsprog
    - I will answer the posted questions at the end of the lecture.

This subject adopts “flipped learning” teaching strategy. You need to complete the “Pre-class” activities to prepare for the interactive quiz and application questions in lectures, which help you prepare for the LMS exam.

How you get support from us?

- Live Lectures and Live Labs are the main scenarios for us to answer your questions, provide feedbacks or advise on your work.
- U:PASS provides extra exercises to help you get better understanding about the materials.
- Consultation time: 3:30pm-4:30pm Tuesday online booking
- Off the class:
  - Check the FAQ on ED --- It's not the discussion board, no one answers questions there!
  - Ask your peers in the **Discussion Board on Canvas Lab page**
  - Ask your tutor
  - Forward the question to the subject coordinator

Post your question to https://padlet.com/angelahuo/appsprog

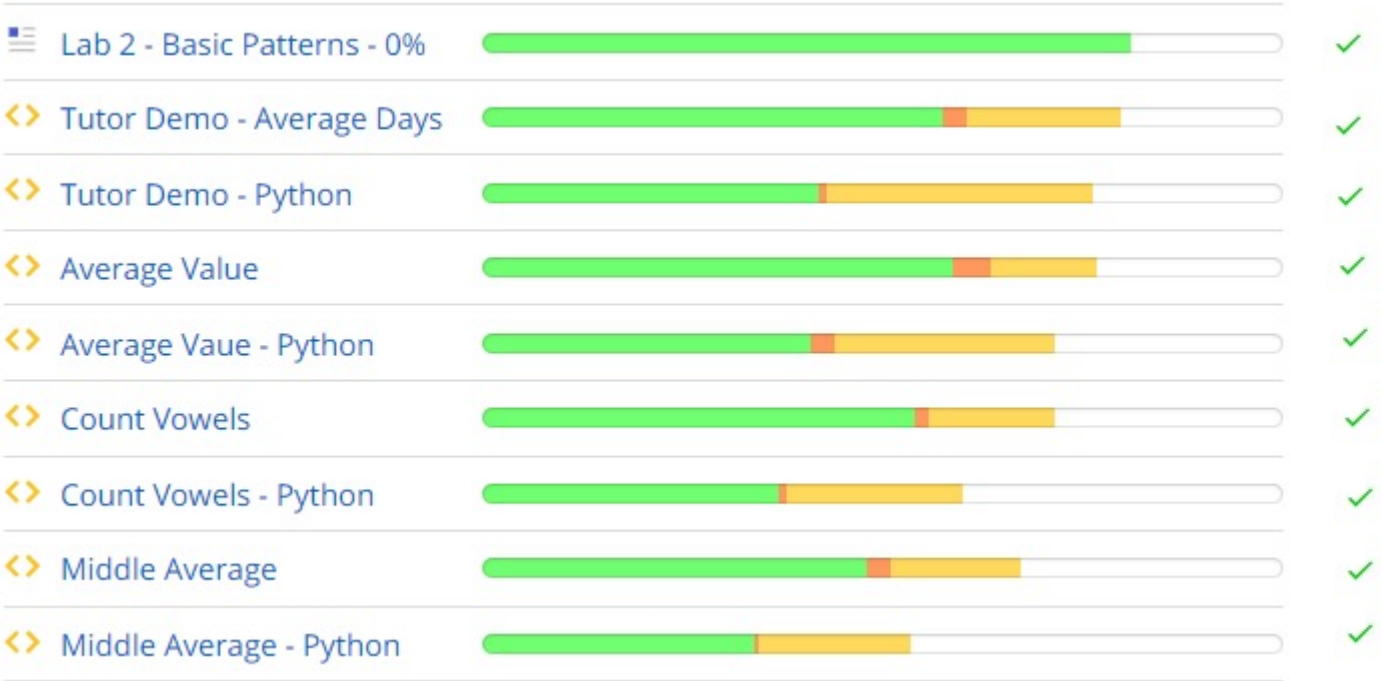
Contents

Prep: Open Question Board(https://padlet.com/angelahuo/appsprog)

1. Lab 2 Review
2. Study 3 Reflection
3. Lab 3 Preview
4. Question Board

Post your question to https://padlet.com/angelahuo/appsprog

Lab 2 Review



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Pattern #1

```
public class AverageValue {
            public static void main(String[] args) {
                        ?
                        int value = In.nextInt();
                        double sum = 0.0;
                        int count = 0;
                        while (value != -1) {
                            sum = sum + value;
                            count++;
                        }
                        double average = sum/count;
            }
}
```

Read pattern

System.out.print(“<prompt>”);
<type> <variable> = <read operation>;

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Pattern #2

```
public class AverageValue {
        public static void main(String[] args) {
                System.out.print("Value: ");
                int value = In.nextInt();
                double sum = 0.0;
                int count = 0;
                while (value != -1)
                {
                    sum = sum + value;
                    count++;
                        ?

                }
                double average = sum/count;
        }
}
```

Read loop pattern

<read pattern>
while (<value> != <end of input>) {
    <use value>
    <read pattern>
}

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Pattern #3

```
int sum = 0;
int count = 0;
System.out.print("Value: ");
int num = In.nextInt();

while (num != -1) {
    if (num > 0) {{
        sum += num;
        count++;
    }
    System.out.print("Value: ");
    num = In.nextInt();
}
double average = (double) sum/count;
System.out.println("Average value = "+average);
```

Sum pattern

<type> sum = 0;

<for each value>

sum += <value>;

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My code runs well on my laptop
Why ED return FAIL to my submission?

Incorrect data

```
% java AverageDays

== Benchmark program's output ==                    |  == Your program's output ==

Average days per month = 30.416666666666668         |  Average days per month = 30.4
```

The bug: only 10 months in array:

```
int months[] = {31, 28, 31, 30, 31, 31, 30, 31, 30, 31};
```

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Output format

```
% java AverageValue

== Benchmark program's output ==

Value: 2
Value: 4
Value: -1
Average = 3.0
```

Prompt should be “Value: “

```
|  == Your program's output ==
|
|  Enter a positive integer2
|  Enter a positive integer4
|  Enter a positive integer-1
|  Average 3.0
```

Missing =

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Repeated output

```
== Benchmark program's output ==

Character: t
Character: r
Character: e
Character: e
Character: .



Vowel count = 2
```

```
|  == Your program's output ==

|  Character:
|  t
|  Vowel count = 0Character:
|  r
|  Vowel count = 0Character:
>  e
>  Vowel count = 1Character:
>  e
>  Vowel count = 2Character:
>  .
   Vowel count = 2
```

```
System.out.println("Character: ");
char c = In.nextChar();

while (c != '.') {
  <process>

System.out.println("Character: ");
c = In.nextChar();

System.out.print("Vowel count = " +
count);

}
```

Question: what's causing the output to be repeated?

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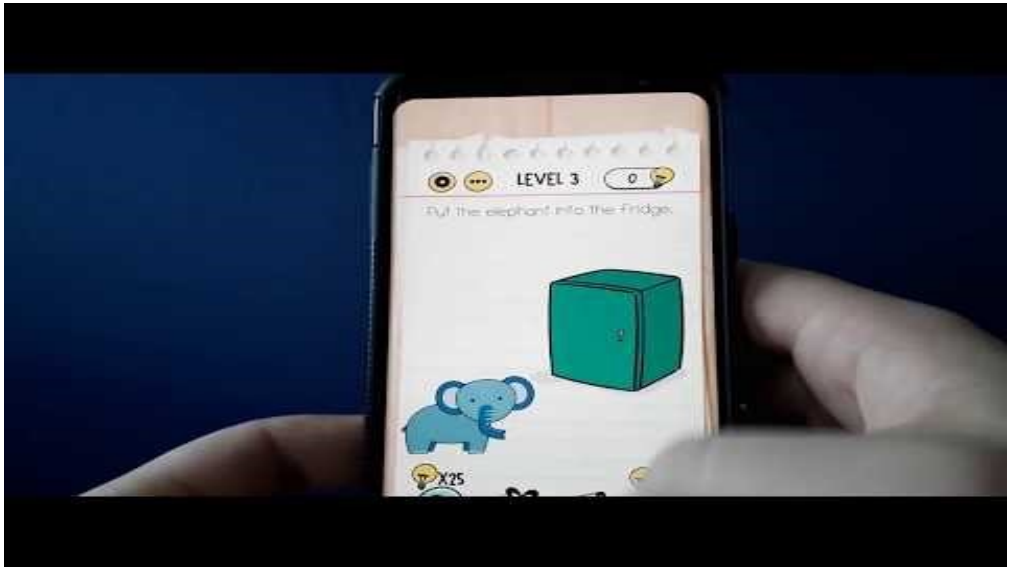
Study 3: Process

- **Incremental goals**
- **Integer arithmetic**
- **Testing**
- **Debugging**



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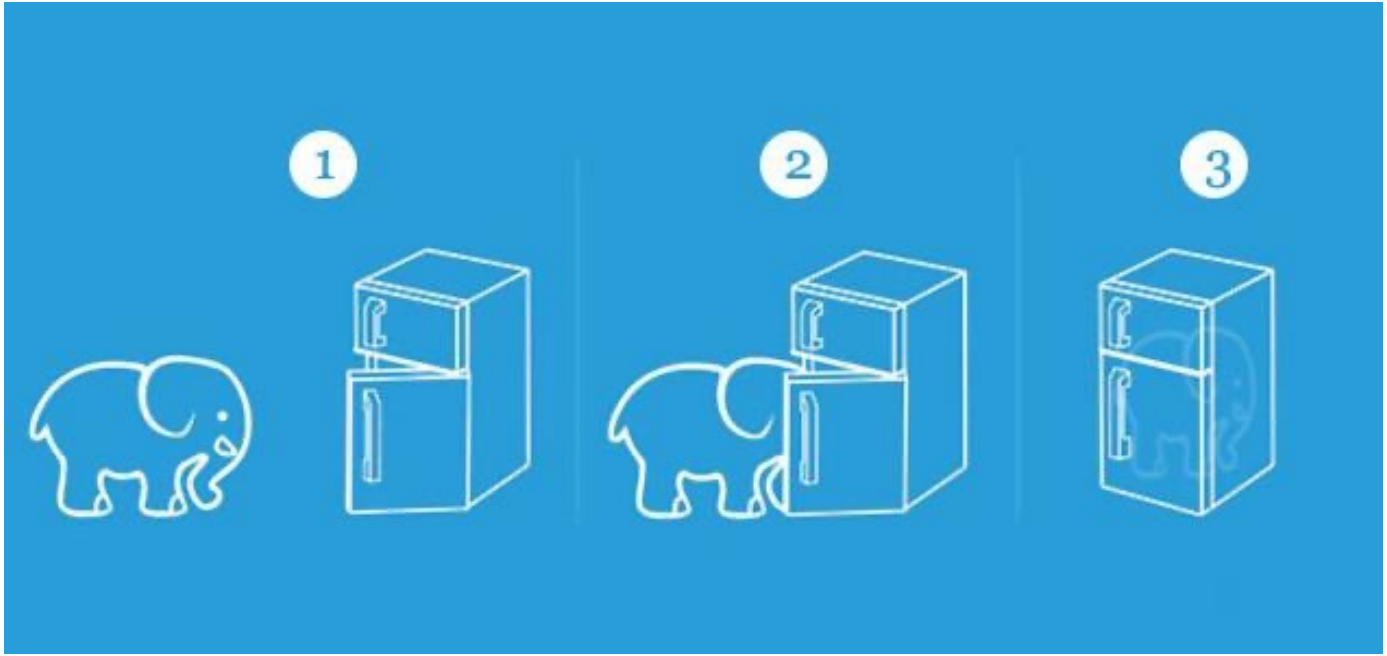
Which part needs incremental goals?



- Input
- Process
- Output

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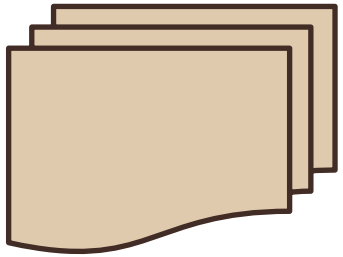
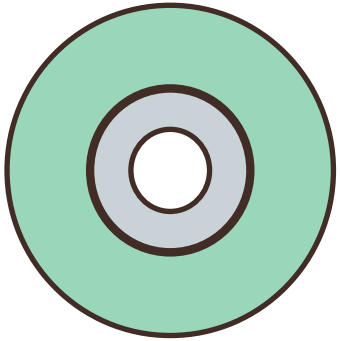
How to build incremental goals?

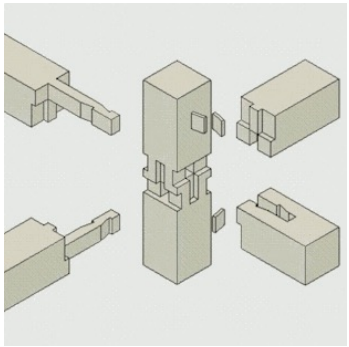
- Break down the solution into sequenced steps!



EASY



MEDIUM



HARD

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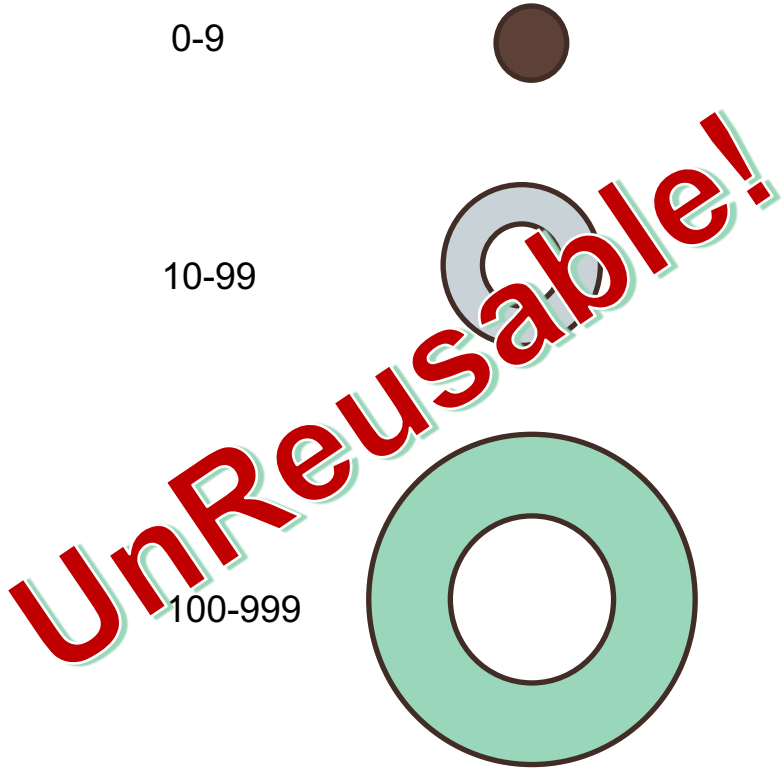
Break it down

- Read in numbers between 0-999 until -1.
- Show the number in words.

Number: 234
two hundred and thirty four
Number: -1



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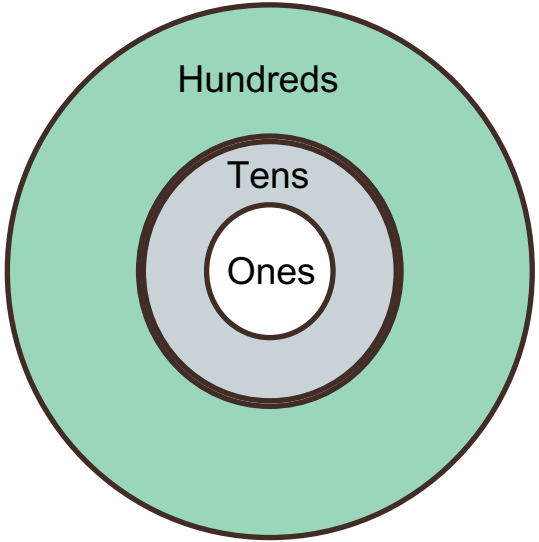
Build it with incremental goals

- Read in numbers between 0-999 until -1.
- Show the number in words.

Number: 234
two hundred and thirty four
Number: -1



Reusable!

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Playing with numbers...

- How do I extract the left-most digit from 70324?
  - 70324 / 10000 = 7
- How do I extract the right-most digit from 70324?
  - 70324 % 10 = 4
- How do I extract the middle digit from 70324?
  - 70324 / 100 = 703; 703 % 10 = 3
  - 70324%1000=324; 324/100=3

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What's the output of the following expression?

- Given a char array: char a[ ] ={'1', '2', '3', '4', '5', '','6'};
  - a[1] =
  - a.length() =
  - a[5] =
  - a[6] =
- Do you think the expression can be improved?

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What does this mean?

- " java.lang.ArrayIndexOutOfBoundsException: Index 10 out of bounds for length 10 at NumberToWords.main(NumberToWords.java:59)“

- Example: int a[10]

  a[10]

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Question:

- Can you explain how count[i] will display correctly the amount that, let's say 80's was counted?

```
public class Frequency{
    public static void main(String[] args) {
        int[] count = new int[10];
        System.out.print("Integer: ");
        int value = In.nextInt();
        while (value != -1) {
            count[value/10]++;
            System.out.print("Integer: ");
            value = In.nextInt();
        }
        for (int i = 0; i < count.length; i++) {
            System.out.println(i + "0's: " + count[i]);
        }
    }
}
```

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Question---How can I write an array or a variable to share them in the same class but in different method ?

```
public class Demo{
    public static void main(String[] args) {
        int a=0;
        int number = aplus(a);
    }
    private static int aplus(int number){
    return number++;
    }
}
```

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Summary

Prep: Open Question Board (https://padlet.com/angelahuo/appsprog)

1. Review
- Lab 2
2. Reflection
- Integer arithmetic, array
3. Question
- Debug, method
4. Lab Guides
- Test, Timing

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Lab 3 Guide

- Remember to keep your patterns books updated! ------It will get harder as the weeks go by to keep all of the patterns

- Create incremental goals and plans. **Design your own test cases.**
  - Breaking down the goal into incremental goals.
  - You come up with your own test cases. ED's test cases are hidden.

- Most important: You will learn how to improve your code!!!

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Timing

- 25min Intro + Demo
- 3-5min write down the incremental goals
- 30-60 minutes write down a plan for reach goal and test cases
- Remaining time – Coding and Consultation!

See you!

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Contact

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- Contact information on Canvas

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