CSE 12 – Basic Data Structures
Prof. Christine Alvarado
[Slides borrowed/adapted from slides by Cynthia Lee]
Today’s Topics

1. Introduce myself to you
2. Course structure and procedures:
   - Your Grade
   - My role
   - Your role
   - Rules
3. Quick overview of the course
4. Quick review looking ahead to HW1
Who Am I?

- **Research:**
  - Pen-based interfaces/sketch recognition
  - Make Computer Science education better and more inclusive

- **Teaching:**
  - CSE 8A, 8AL, 8B, 12, 100, 599, ERSP

- **When I’m not working:**
  - Kids and family
  - Running and swimming
The Basics: Your Grade

- 5% Clickers
  - Participation only, not correctness
  - Answer at least 80% to get credit for that lecture (drop 6 + maybe 6 more... that depends on you!)
- 5% Reading quizzes (drop 3)
- 5% Review quizzes (Mondays in class)
- 25% Midterm
- 30% Homework Assignments
- 30% Final Exam
What do I do in/for this class?

- Think of me as your tutor
- Be your guide in inducing you to explore concepts
- Create situations and pose problems that set the scene for your exploration
- Answer your questions
- Not spend lecture reading the textbook to you with slightly different words
Your job: An example
It takes hard work to change your body... and your mind

- Have you ever heard of an aerobics class where the instructor did all the exercises at the front of class, while the class just watched attentively?
- **Me neither.**
- To learn, you must do the work with your own muscle (your brain).
What do you do in class?

(before class, you prepared yourself by reading; a reading quiz at the beginning of class will check your preparation)

1. I ask a question
2. You first answer it by yourself
3. Then discuss in assigned groups of 3-4 students
   - Like a jury, you must come to a unanimous decision
   - Answer the question a second time
4. I will ask groups to share their insights, and I will provide additional clarification as needed
Have you used clickers before?

A. Yes, in our CSE dept
B. Yes, not in CSE but in a different dept/school
C. No
Tips for a good group discussion

- Take turns being the first one to talk
- Once you all agree on the answer, don’t stop!
  - Always go over each wrong answer and explain why it is wrong
  - Also interesting and useful to think about why somebody might be tempted to choose
- Even if your group-mate has said something very clearly and correctly, it’s a good idea to repeat it yourself
  - “So, what I think you said was, …”
  - Might seem pointless, but your brain will remember better if YOU say it too
About the reading

- **Optional textbook:**
  - *Data Structures in Java* by Simon Gray

- **Reading Quiz reading assignments:**
  - Reading assignments necessary to complete the reading quizzes will be based on a combination of lecture slides from Prof. Kube’s version of CSE 12, and other resources from the internet (e.g. Wikipedia, videos, etc.).

- **Pre-class “Reading” Quizzes:**
  - Before class, you must complete a short quiz on a site called QuizStar
About the pre-class quizzes

- There will always be a quiz unless otherwise specified in the schedule.
- To find it, go to http://quizstar.4teachers.org/
  - You will receive your login and pw by tonight.
  - Look for currently active quiz.
- You get 3 tries on each quiz.
- Quizzes are open book and open notes, but must be done SOLO.
- **Quizzes close 10 minutes before class time.**
Recommendation for reading and pre-class quizzes

- Skim the reading assignment to get a basic idea of what it talks about.
- Do the online (open book) quiz, going back to the reading as necessary to read the parts that help you answer the quiz questions carefully.
- This will only work if you START EARLY on the quiz. If you try to do the quiz 5 minutes before it's due will not result in the necessary background learning before class, and the quizzes will seem like pointless and frustrating exercises.
Monday morning “review” quizzes

- Each Monday (except today) you will have a short quiz (via clicker) on topics from the previous week.
- These serve as a checkpoint for your learning
- If you don’t do well:
  - Take steps to help the material sink in
  - GO TO DISCUSSION!
About Discussion Section

- No discussions week 1
- There are 2 discussions for this section, and 2 for section B00
- You can go to any of them, BUT...
- If you go to A01 or A02 ("our" discussions) then you will earn back any lost points on your review quiz that week!
Rules for what you do in this course

- Weekly Homework Assignments (programming and more)
  - Yes:
    - Work on it individually
    - Use our tutor staff as your partners! Let us help you on Piazza and in lab hours
    - Two “slip days” worth a 24 hour extension
  - No:
    - Using two slips days on one assignment
    - Late turn in beyond the two slip days. Guard against the tragedy of getting a zero by starting early!! (this hurts now but will prepare you for classes like compilers, as well as for life)
Rules for what you do in this course

- **Exams**
  - **Yes:**
    - Ask instructor or TA for clarification
    - Bring photo ID, pen/pencil
  - **No:**
    - Bringing blue book, scantron, etc (you will write all answers on the exam)
    - Consulting book, notes, calculator
    - Cheating
Rules for what you do in this course

- Class Participation
  - **Yes:**
    - “Click in” and engage actively with your group and with me, even when (or especially when!) you are unsure or struggling
    - The only way to get through a struggle is to work
    - If you let me know that you are struggling, by asking a question or by clicker response, I can help—this is a huge favor to me because it helps me steer the lesson in the most helpful direction
    - Treat other class members kindly and be conscious of creating a positive, collaborative team environment
  - **No:**
    - No clicking in for someone who isn’t here, or otherwise feigning participation
    - I know that everyone has off days, sleepy days, etc, and that’s fine. But please don’t ever allow your behavior to become distracting or rude to anyone else
Data Structures

Map of the course
What is the most important aspect of a “real world” large program?

- 2 mins brainstorm with your groups

- Understand the code
- Efficient
- It works!
- Easy to use
- Easy to maintain
- Security
Course topics

- Abstraction and Abstract Data Types (ADTs)
- Application Programmer Interfaces (APIs)
- Algorithm Time, Space, and Energy Cost Analysis
- Object-oriented Software Design Patterns, including Inheritance, Composition, Adapter, and Iterator
- Software Testing and the JUnit framework
- Java Classes and Interfaces
- Collections, and the Java Collections Framework
- Java Generics
- Arrays, Stacks, Queues, Circular Arrays
- Searching and Sorting Algorithms
- Trees, Heaps, Binary Search Trees, Abstract Syntax Trees
- Hashing and Hash Tables
HW1: Warning

- HW1 is designed to get you started in CSE 12 but, it is not a warm up (CSE 8B/11 was your warm up)
- We expect that you remember things from 8B/11...

https://sites.google.com/a/eng.ucsd.edu/cse-8b-winter-2014/
Which line would call the program above, passing it the command line argument 42?

A. `java Review12`
B. `java Review12( 42 )`
C. `java Review12 42`
D. `java Review12 {42}`
public static void main( String[] args )
{
    if ( ___________________ ) {
        System.out.println( "Too few arguments" );
        return;
    }
}

What goes in the blank to make the program exit if the user does not enter at least one command line argument?
A. args[0] < 1
B. args.length < 1
C. System.in < 1
D. System.in( args ) < 1
public static void main(String[] args) {
    if (args.length < 1) {
        System.out.println("Too few arguments");
        return;
    }

    String[] strArray = new String[args[0]];
    System.out.println(strArray[0]);
}

Which line above causes a compile error, A or B?
public static void main( String[] args )
{
    if (args.length < 1) {
        System.out.println( "Too few arguments" );
        return;
    }

    int index = Integer.parseInt( args[0] );
    String[] strArray = new String[index];
    System.out.println( strArray[0] );
}

What does this code print, when called with the command line argument 42?
A. null
B. "" (the empty string)
C. 0
D. Nothing, there is a null pointer exception
E. Nothing, there is an array index out of bounds error