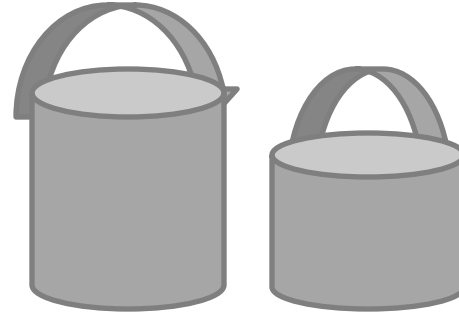


# CS 302 Introduction to Programming

Welcome!

# Puzzles

1. You have one 5 gallon bucket, one 3 gallon bucket, and a hose with an inexhaustible supply of water. How can you get 4 gallons of water in one of your buckets?

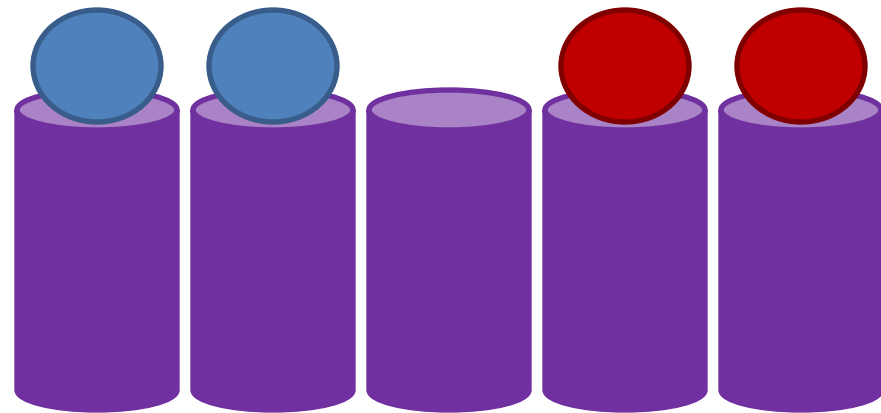


2. You have 5 cups that are upside down. The two cups on the left have blue balls on top of them and the two on the right have red balls. Switch the locations of the balls with a minimum number of steps.

Switch the locations of the balls with a minimum number of steps.

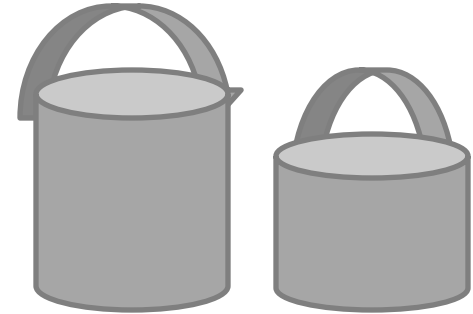
One step is:

- Jump one ball
- Move a ball one cup to the left or right



# Possible Solution to Puzzle 1

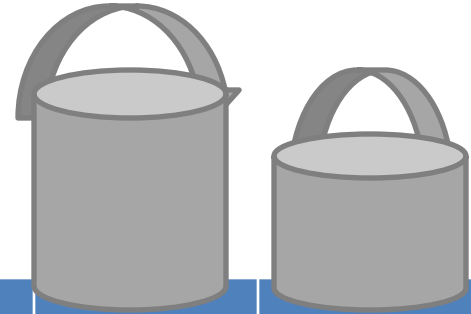
1. Fill the three gallon bucket
2. Pour from the three gallon bucket into the five gallon bucket.
3. Fill the three gallon bucket.
4. Pour as much water as possible from the three to the five. (This will be only 2 gallons before it is full).
5. Empty the five gallon bucket.
6. Pour the remaining 1 gallon from the three gallon bucket to the five gallon bucket.
7. Fill the three gallon bucket.
8. Pour the three gallon bucket into the five gallon bucket.



| Step |   |   |
|------|---|---|
| 1    | 0 | 3 |
| 2    | 3 | 0 |
| 3    | 3 | 3 |
| 4    | 5 | 1 |
| 5    | 0 | 1 |
| 6    | 1 | 0 |
| 7    | 1 | 3 |
| 8    | 4 | 0 |

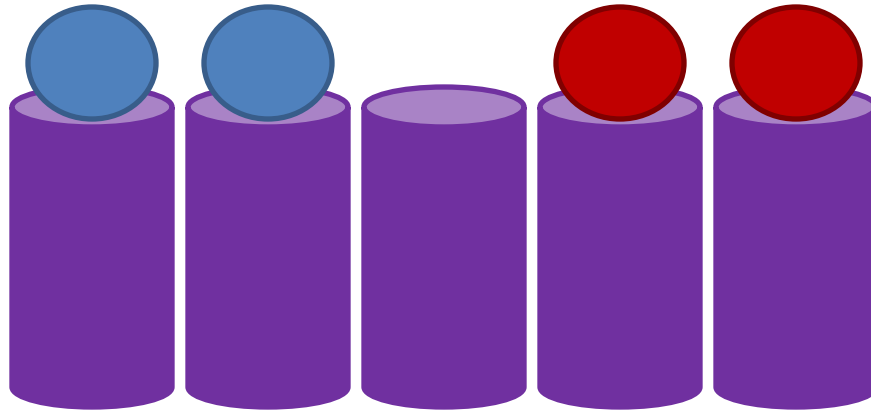
# Another Solution to Puzzle 1

1. Fill the five gallon bucket.
2. Pour as much as possible from the five gallon bucket to the three gallon bucket.
3. Dump out the three gallon bucket.
4. Pour the five gallon into the three gallon.
5. Fill the five gallon bucket.
6. Pour as much as possible from the five gallon to the three gallon (this will be 1 gallon).

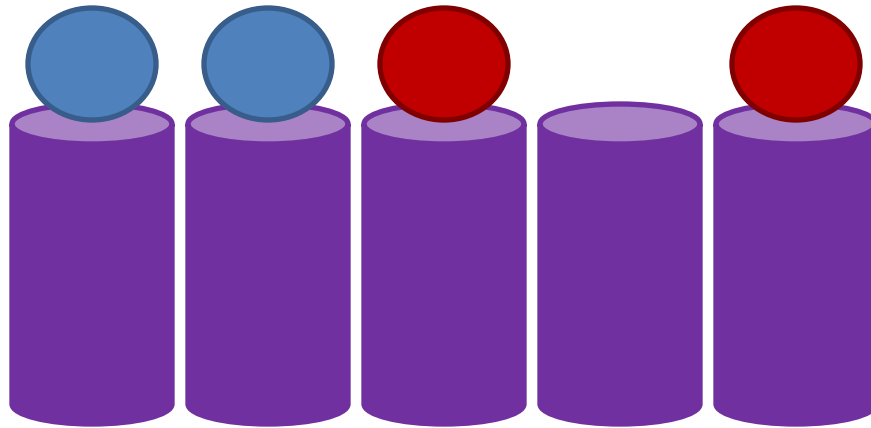
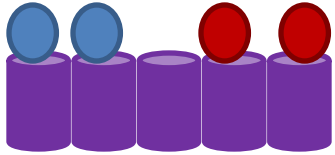


| Step | 5 Gallon Bucket | 3 Gallon Bucket |
|------|-----------------|-----------------|
| 1    | 5               | 0               |
| 2    | 2               | 3               |
| 3    | 2               | 0               |
| 4    | 0               | 2               |
| 5    | 5               | 2               |
| 6    | 4               | 3               |

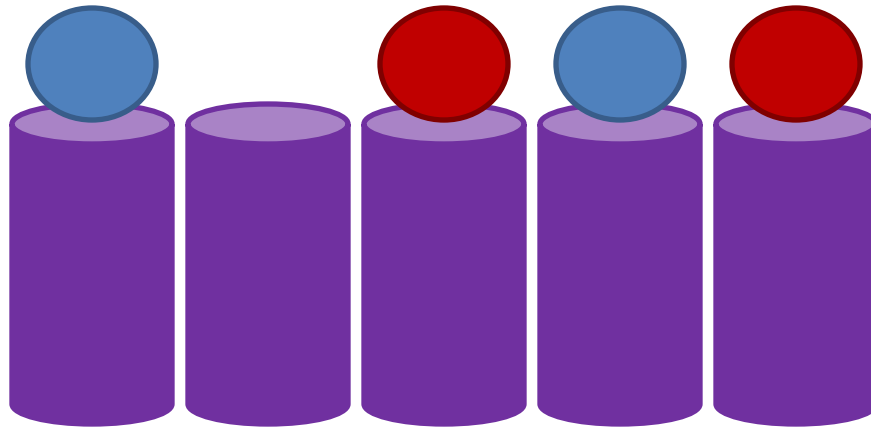
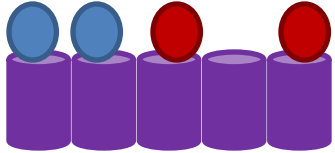
# Possible Solution to Puzzle 2



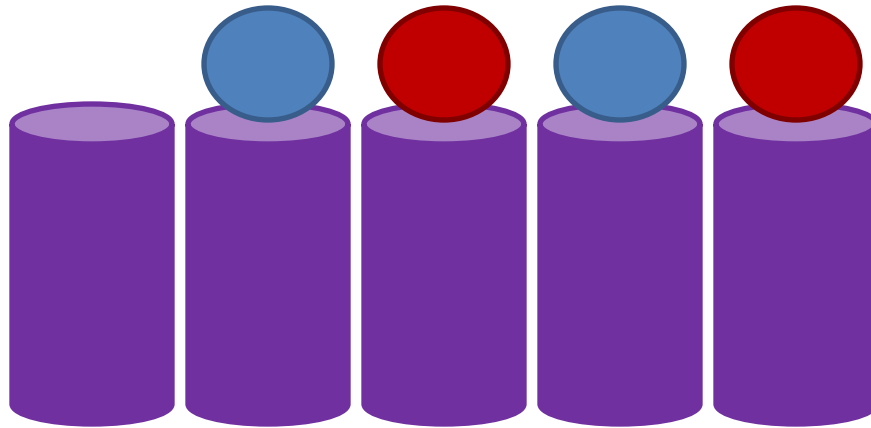
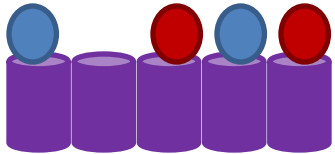
# Possible Solution to Puzzle 2



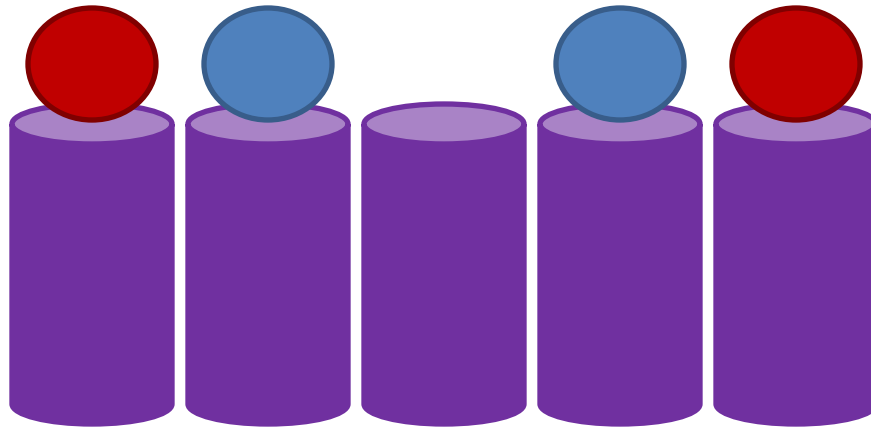
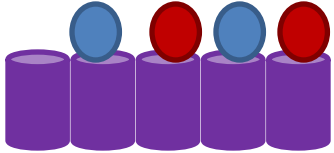
# Possible Solution to Puzzle 2



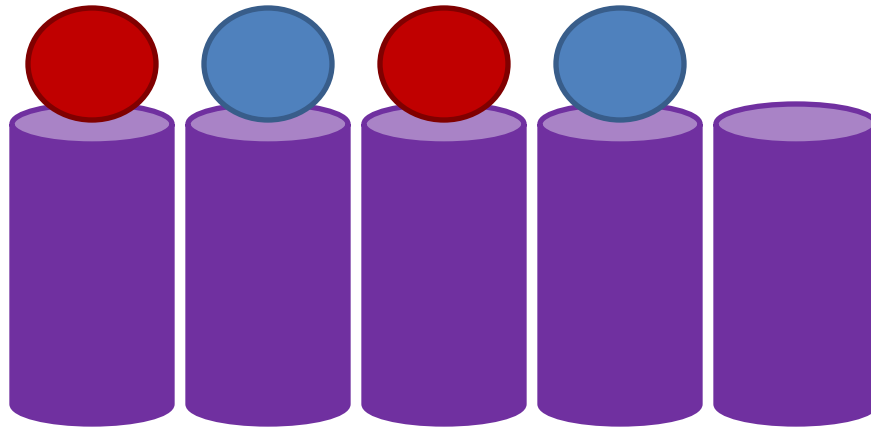
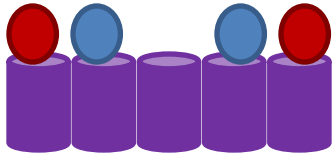
# Possible Solution to Puzzle 2



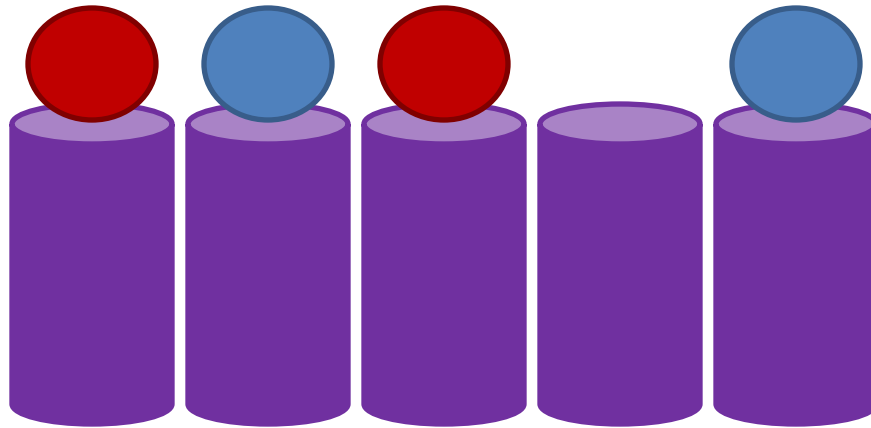
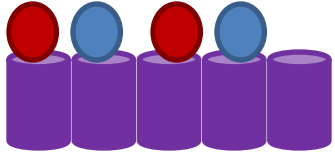
# Possible Solution to Puzzle 2



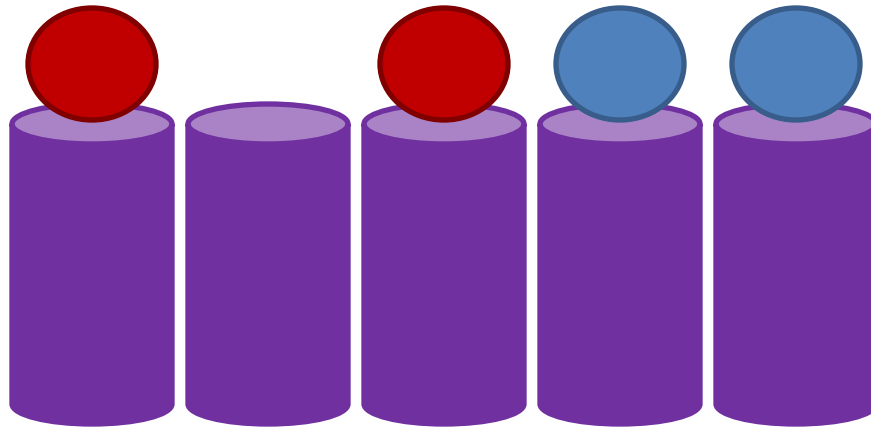
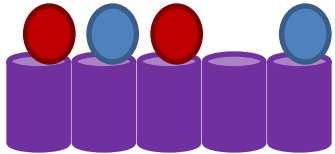
# Possible Solution to Puzzle 2



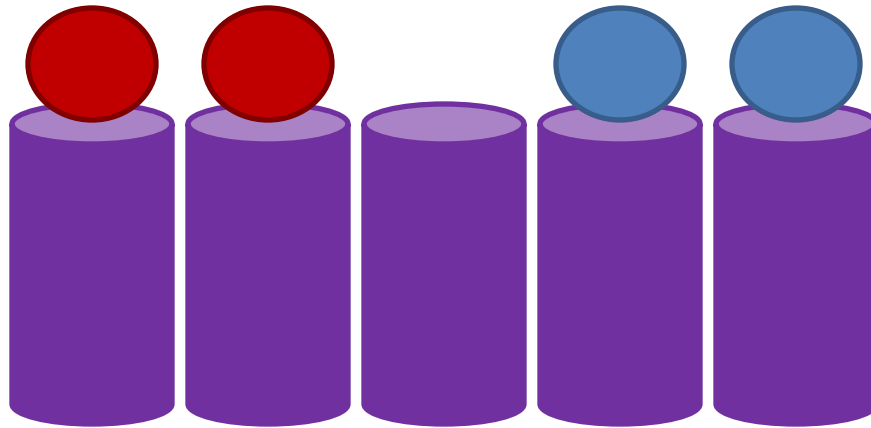
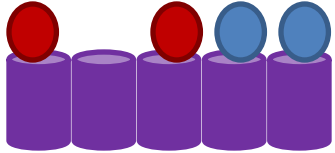
# Possible Solution to Puzzle 2



# Possible Solution to Puzzle 2



# Possible Solution to Puzzle 2



# Introductions

# Team Puzzle

- Each pair needs scissors and sheets of paper. Cut out two copies of each shape you want to use and give one to each partner.
- Partner one creates a design out of the shapes which partner two does not see.
- Partner one then describes their design-without watching partner two-and partner two attempts to create a duplicate of the design.
  
- When finished, compare the two designs to see how similar they are.
  
- Reverse roles and repeat.

# CS 302: Introduction to Programming

## Course Information, Spring 2012

Instructor: Alicia Maxwell Email: [amaxwell@cs.wisc.edu](mailto:amaxwell@cs.wisc.edu)

Lecture 5: 11:00 AM - 11:50 PM MWF,

Office: 1308 Computer Science Office Hours: To Be Announced

Course Homepage: <http://pages.cs.wisc.edu/~cs302/> (under construction)

Lecture 5 Homepage: <http://pages.cs.wisc.edu/~cs302-5/> (under construction)



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**Description** This course introduces you to fundamental computer programming concepts as you learn to program in the Java language. Algorithm development, structured programming, code organization (methods), data organization (arrays), basic object-oriented programming, exception handling, and file access are covered.

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**Learning Objectives** Students successfully completing this course will be able to analyze problems and formulate algorithms; create robust, user-friendly, well-structured and well-documented Java programs; read basic Java programs to determine their purpose; and have a basic understanding of how computers work.

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**Registration** The only way to add CS 302 or to change sections is through the UW's online enrollment system.

**Auditing** Auditing is not allowed for CS 302, but you may sit in the course with the instructor's permission.

**Pass/Fail** Pass/Fail is allowed by some departments. See your academic advisor. Your department might require a grade of C or better to receive credit and a grade of Satisfactory.

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**Textbook** Java for Everyone

**Required** by Cay Horstmann, FIRST edition, © 2010 Wiley; available for purchase in printed form (textbook or binder versions), electronic form (e-Book), and also on reserve at Kurt Wendt and Helen C. Libraries. See <http://pages.cs.wisc.edu/~cs302/?r=text> for more information.

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**Computer Labs** There are two instructional Windows computer labs for you to practice programming and do your programming assignments.

These labs are on the first floor of the CS building in rooms 1366 and 1368. They are open from 7 AM to 1 AM each day. They are used for the lab sections when scheduled and otherwise are open labs for 302 students. During the some of the open lab times, consultants are scheduled to assist students. See <http://pages.cs.wisc.edu/~cs302/?r=computerLabs#Consultants> for more information.

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## Course Work

Labs give you valuable experience using a computer while you work with a partner to solve problems.

### Labs (10%)

**LAB SECTIONS START ON TUESDAY, 1/31.** CS 302 students register for one 75-minute lab, which meets once per week in the computer labs mentioned above. You must attend the lab for which you enrolled. You'll be assigned different lab partners and computers during the semester. Lab TAs guide labs and are there to help you succeed on the lab problems.

Labs grades are based on prompt attendance, preparation, cooperation with your partner, and progress completing the lab.

### Programs (30%)

Programming assignments are comprehensive projects that require substantial time and effort.

Programming assignments give you an opportunity to use the skills you've learned in lecture, the labs, and the textbook readings. There will be four programming assignments. The experience you gain doing programming assignments helps prepare you for exams, future CS courses, and a

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career in CS.

Programming assignment grades are based on correctness, technique, and documentation. Late work is NOT accepted for a grade. Extensions are given for circumstances, such as illness, when you notify your instructor at least three days before the due date. You are responsible for: protecting your work from access by other students; performing frequent backups of your work; and verifying that you have correctly handed in your work (we'll be showing you how).

Exams are a primary tool we use to evaluate your performance in this course.

There will be three exams at the dates listed below. The first exam will be multiple choice questions, the second exam will be entirely written, and the final exam will be multiple choice and might have a few written questions.

### Exams (60%)

- o Midterm 1 (20%) Thursday, March 8th, 2012, 5:00 - 7:00 PM
- o Midterm 2 (20%) Thursday, April 12th, 2012, 5:00 - 7:00 PM
- o Final Exam (20%) Thursday, May 17th, 2012, 7:45 AM - 9:45 AM

If you have a conflict with any of the above exam dates, you must notify the course coordinator within the first three weeks using the CS 302 web form. (We'll be showing you how in the first lab.) Requests for make-ups after an exam are rarely given and only for verifiable emergencies.

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- may work with one partner
- submit electronically

## Pair Programming

Pair programming with another classmate on each programming assignment is allowed. You may have a different partner for each programming assignment, but you may NOT have more than one partner on a single programming assignment. Read the online *Pair Programming Guidelines* before viewing or allowing another student to view, or have electronic access to, any portion of your program. See <http://pages.cs.wisc.edu/~cs302/?r=coursework#pp> for more information. Meet with your instructor or Lab TA if you have any questions regarding the guidelines or procedures for pair programming. Giving access to your code or using as your work any portion of code written by anyone other than your partner, is NOT allowed and is academic misconduct.

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## Academic Conduct

We expect that all students will conduct themselves with honesty and integrity. Academic misconduct is not acceptable. You are responsible for doing your own work as well as securing your work so that it is not available in any form to students other than your partner. Failure to do so can result in an academic misconduct investigation. Any investigation of academic misconduct is reported to the Dean's Office. If you are unsure if something is allowed or not allowed, ask your instructor or Lab TA BEFORE you do it. Additional information about policies specific to CS 302 can be found on the CS 302 course web pages. See <http://pages.cs.wisc.edu/~cs302/?r=coursework> for more information. Information about University Academic Misconduct policies and procedures can be found at: <http://www.wisc.edu/students/saja/misconduct/misconduct.html>

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## Reminders

Make sure to:

- Notify the course coordinator using the CS 302 online form within the first three weeks of classes if you have conflicts with any of the exam dates (we'll show you how in the first lab).
- Notify your instructor within the first three weeks of classes if you participate in religious observances that might conflict with course requirements.
- Notify your instructor as soon as you become ill if you want to request an extension.
- Attend lectures and lab sections (labs start on 1/31).
- For those enrolled in WES-CS, your group meetings start this week.
- Stay up-to-date on assigned readings and web page announcements.
- Backup your programming work frequently to avoid major as well as minor losses of work.
- Don't wait to get help if you start to fall behind. See your instructor immediately.



DEPARTMENT OF  
**Computer Sciences**  
UNIVERSITY OF WISCONSIN-MADISON