CS 111: INTRODUCTION TO COMPUTER SCIENCE

Professor: Antonio Miranda
Office hours: M,W 7pm-8pm or by appointment
Email: antonio.miranda@cs.rutgers.edu

Lecture notes (when available) and resources:

SAKAI → resources → miranda →slides

Lectures and Instructors

- Andrew Tjang (coordinator) atjang@cs.rutgers.edu
Office: HLL407

- Lou Steinberg (lou@cs.rutgers.edu)
Office: HLL401

- Ana Paula Centeno (anapaula@cs.rutgers.edu)
Office: HLL359

- Antonio Miranda (am2073@cs.rutgers.edu
Office: TBD

- Thu Nguyen (tdnguyen@cs.rutgers.edu)

Office: TBD

Check Rutgers Schedule of Classes for times/locations of lectures.

Sakai will show most updated office hours/locations

Recitations

Group Problem-Solving Exercises

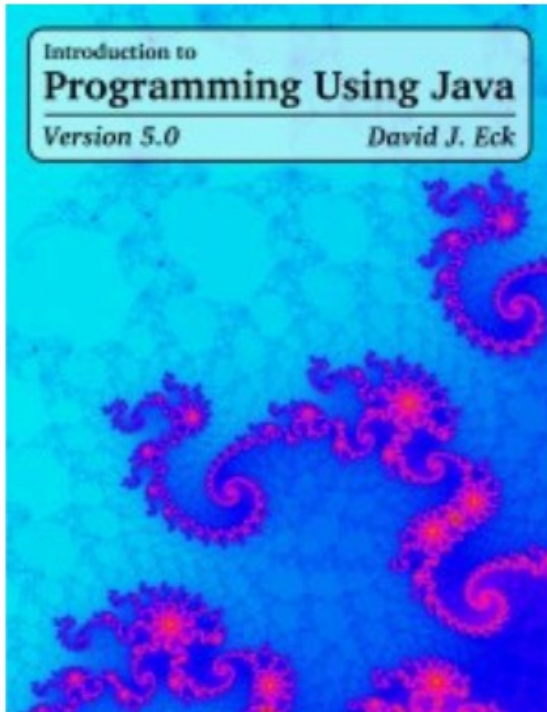Led by Undergraduate peer leaders

Participation Required

Starts Next Week

Resources + Requirements

Piazza.com Online Discussion Forum

Turing's Craft Codelab

FREE ONLINE textbook

Introduction to
Programming Using Java
Version 5.0   David J. Eck

http://sakai.rutgers.edu

Sakai @ Rutgers

Assignments
Grades
Announcements
Textbook
Lecture Slides
Code Samples
Syllabus, Policies

What is CS111?

- **Intro to Computer <u>Science</u>:**
  - Introductory programming (using Java)
  - Concepts and principles that underlie the field of CS
  - **Ways of thinking**
- **Prepares CS majors & minors for further CS courses**

What is CS111?

An Intense Course!
8 – 12 Hours/Week of Work
Expected Outside of Class

What is CS111?

- **A hard course for many.**
  - **Keep an eye on the drop date: see**

    nbregistrar.rutgers.edu/undergrad/enrol-nb.htm
  - **If you are on or near probation, you take 111 at your own risk.**

Alternatives to CS111

- **Introduction to computers (concepts, applications, a taste of programming):**
  - CS 110/170
- **Computing for Math and the Sciences:**
  - CS 107
- **A non-technical survey of the big ideas in CS:**
  - CS 105

CS 111 Prerequisites

- **Pre-Calculus or placement in Calc I**

No prior exposure to programming is assumed

Basic Computer Skills You Are Expected to Know

- ✓ Using Email

- ✓ Using the Web

- ✓ File Types (Zip, Text, Executable, etc.)

- ✓ Finding Files on the Computer

- ✓ Zipping Files

- ✓ Using Command Window/Terminal/XTerm

Grading

Homework: 10%

Recitation: 10% (Attendance and
participation)

Codelab: 10%

Project: 10%

Midterms: 30% (15% each)

Final Exam: 30%

Research Statement

As Rutgers is a research university there is a possibility that by enrolling in this class you may be asked to participate in a research study. Participation in any such study will be optional and at no time will participation in a research study be part of a grade or a requirement for this course. This notification does not imply that by enrolling in this class you have provided consent to be a subject in a research study. Should you be asked to participate in a research study a consent form will be presented to you describing the study and asking for your signature. Participation in research is always voluntary and refusing to participate will have no adverse effects on your standing in the course. To learn more about research at Rutgers University and Human Subject research go to

http://orsp.rutgers.edu/index.php?q=content/institutional-review-board-irb

The Programming Process

1. Problem Analysis

   - inputs, outputs, error conditions

2. Program Design

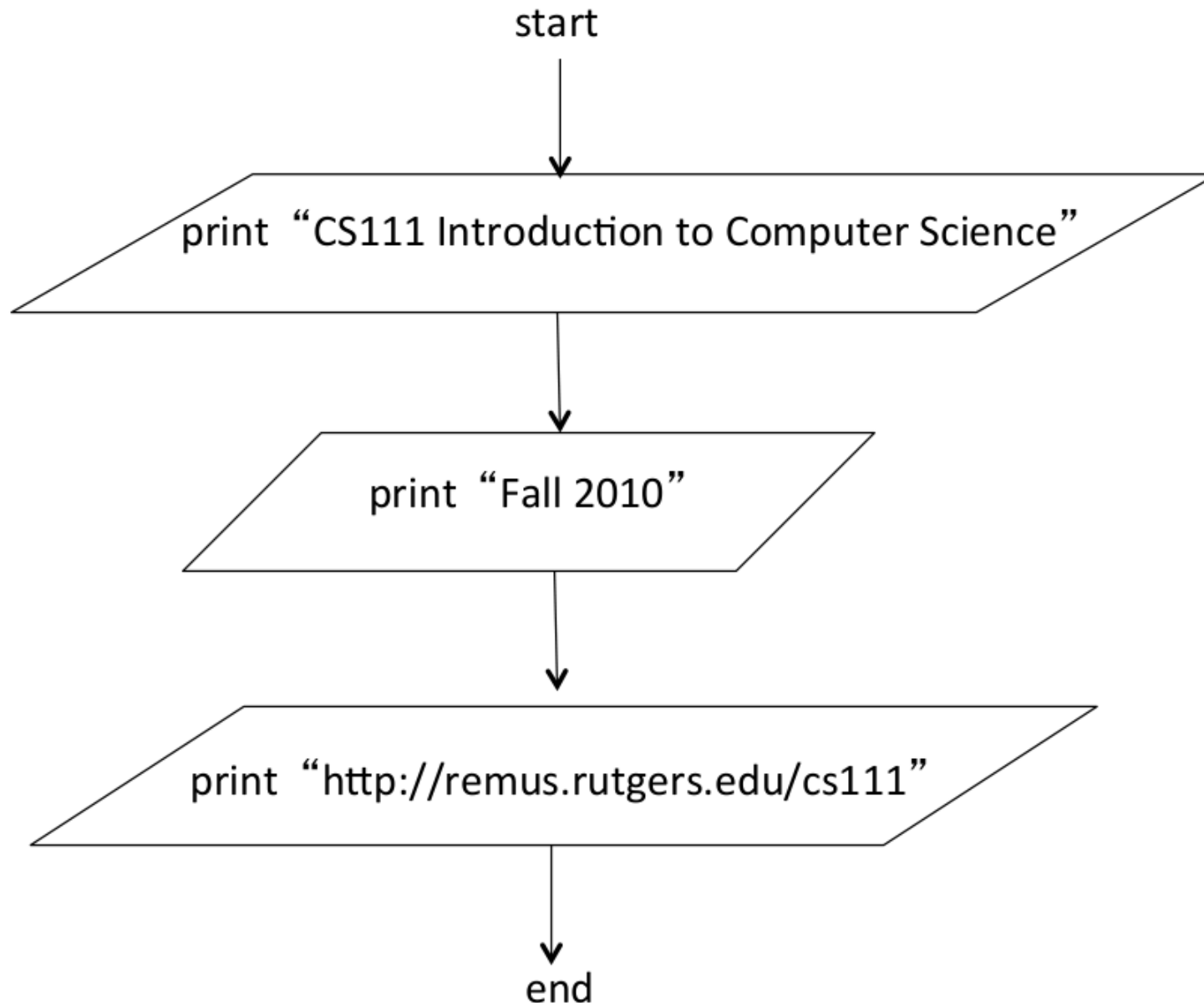3. Algorithm Construction

   - will use flowcharts

4. Coding

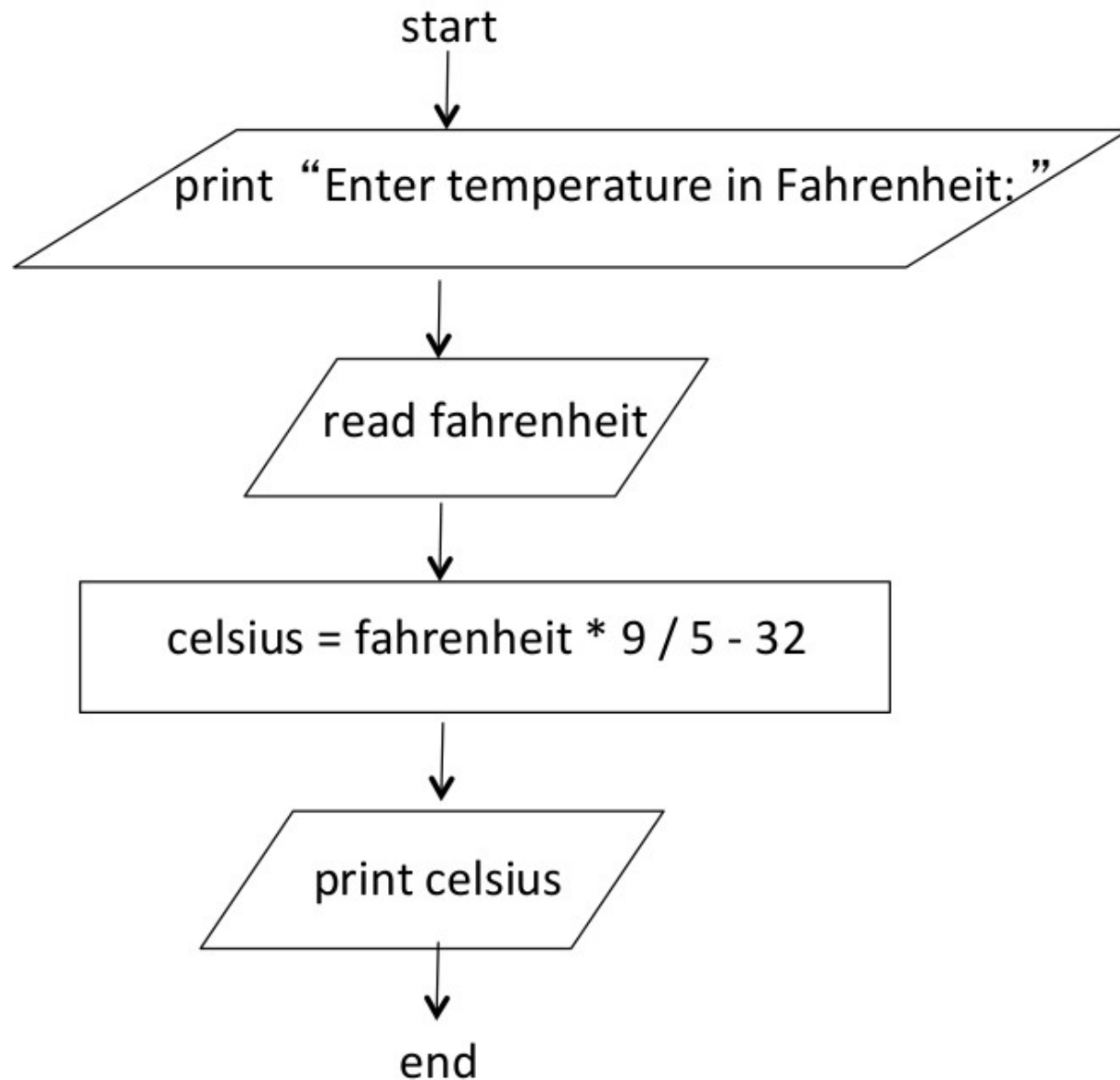   - will use a programming language (Java)

5. Testing

DESIGNING PROGRAM LOGIC

FLOWCHARTS

Printing Data/Information (Output)

start

print "CS111 Introduction to Computer Science"

print "Fall 2010"

print "http://remus.rutgers.edu/cs111"

end

Printing (output), reading (input), computing (processing)

start

print "Enter temperature in Fahrenheit: "

read fahrenheit

celsius = fahrenheit * 9 / 5 - 32

print celsius

end

Does The Program Work Correctly?

Check by running it for various input (fahrenheit) values, and compare the output (celsius) value against the expected (correct) value. This process is called TESTING

Input (Fahrenheit)	Output (Celsius)	Expected Result
32	25.6	0
100	148	37.78
-40	-104	-40
-300	-572	-184.44

The results of testing the program show that it does NOT work correctly.

~~celsius = fahrenheit * 9 / 5 - 32~~

celsius = (fahrenheit – 32) * 5 / 9   Retest to confirm that this is correct

Are All Input (Fahrenheit) Values Acceptable?

The temperature of **-273.15** Celsius is called ABSOLUTE ZERO.
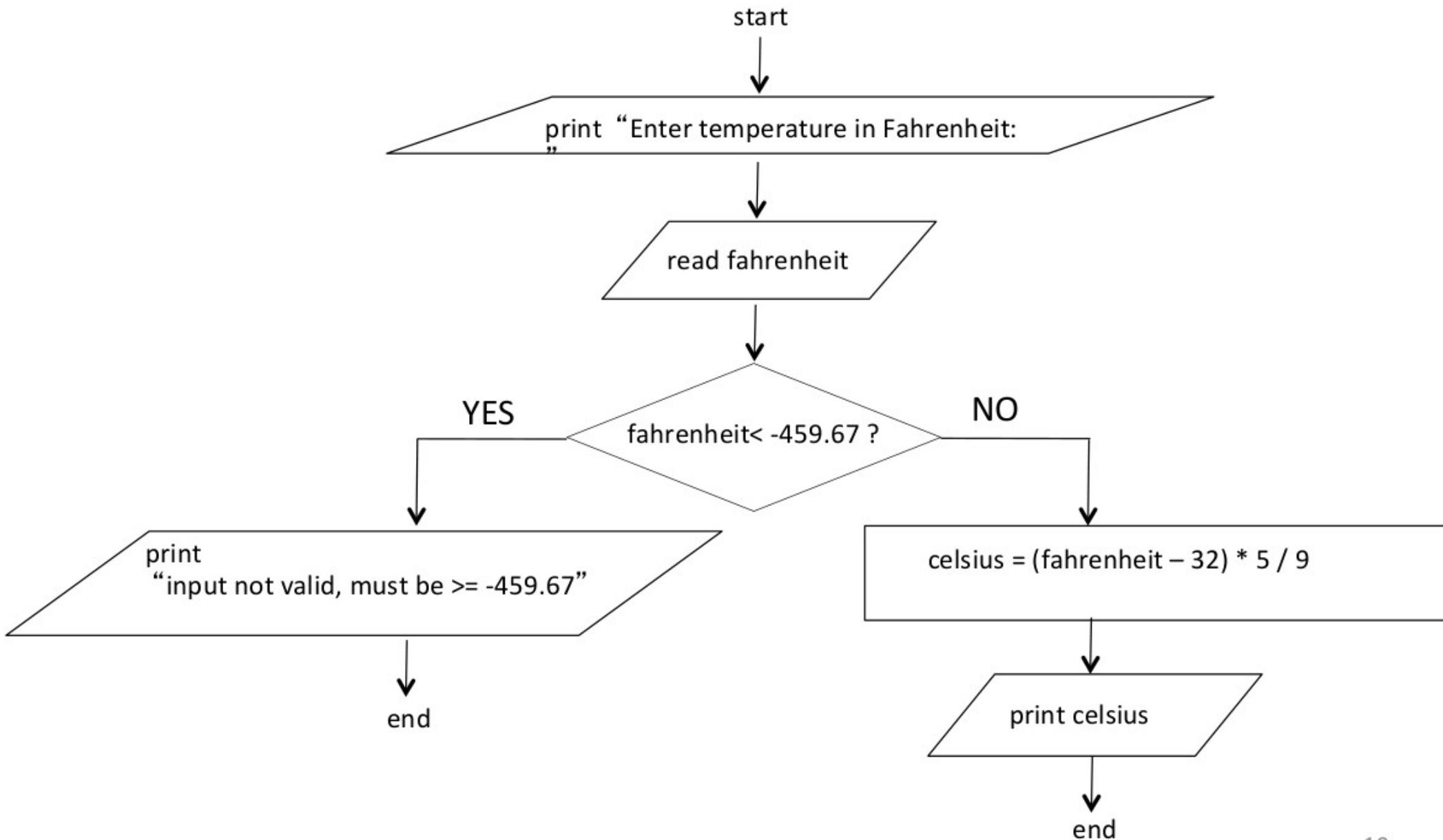
Molecular energy is minimal at absolute zero.

Absolute zero **cannot be reached** by natural or artificial means

-273.15 Celsius is equivalent to **-459.67** Fahrenheit –
any F values less than this would be below absolute zero.

Input values less than**-459.67** are NOT acceptable to our program

Rejecting Unacceptable Input – Making a Decision (Yes/No)

start

print "Enter temperature in Fahrenheit: "

read fahrenheit

fahrenheit< -459.67 ?

YES

NO

print "input not valid, must be >= -459.67"

celsius = (fahrenheit – 32) * 5 / 9

end

print celsius

end

Does The Modified Program Work Correctly?

TEST by running it for various input (fahrenheit) values, and compare the output (celsius) value against the expected (correct) value.

Input (Fahrenheit)	Output (Celsius)	Expected Result	
32	0	0	
100	37.38	37.78	
-40	-40	-40	
-300	-184.44	-184.44	
-459.67	-273.15	-273.15	ABSOLUTE ZERO
-500	Input not valid...	Input not accepted	

The results of testing the program show that it works correctly.

CORRECTLY WORKING means producing correct results for valid inputs, AND rejecting invalid inputs WITHOUT CRASHING.