
16.216

ECE Application Programming

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Fall 2011

Lecture 19: Finishing PE3

Lecture outline

- Announcements/reminders
 - Program 5 due Tuesday, 10/25
 - Program 4 solution posted
 - Today: finishing PE3
 - Review flowcharts
 - Adapting flowcharts to code

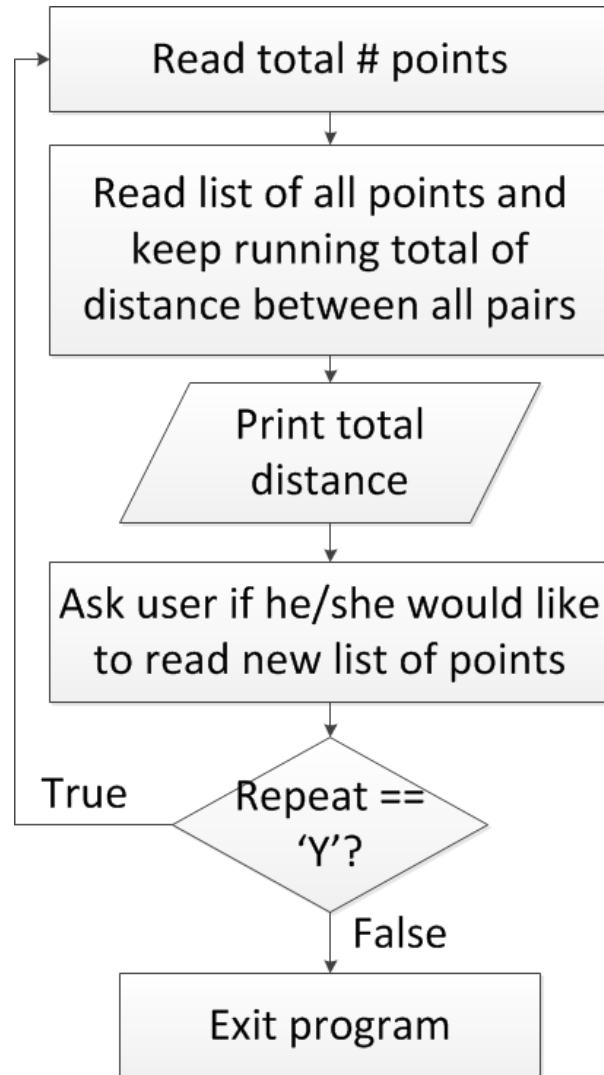
PE3 setup

- Given a series of points, calculate the total distance traveled between all points.
 - Note that, given a pair of coordinates (x_1, y_1) and (x_2, y_2) the distance between them is:

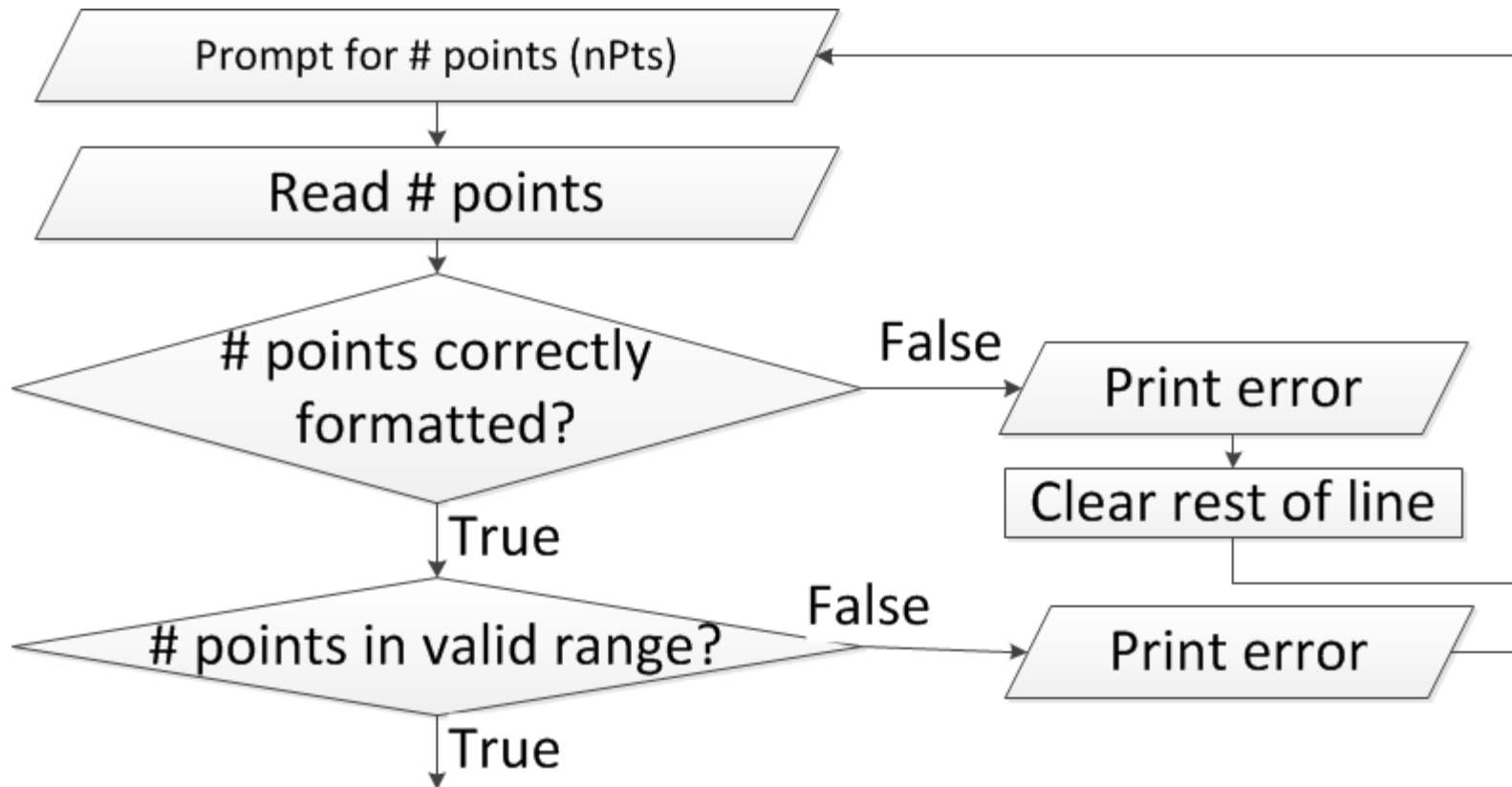
$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

- User will first enter # of points to be read
- Points will then be listed in the form:
 - `<letter> <x coord> <y coord>`
 - Ex: A 1.2 3.5

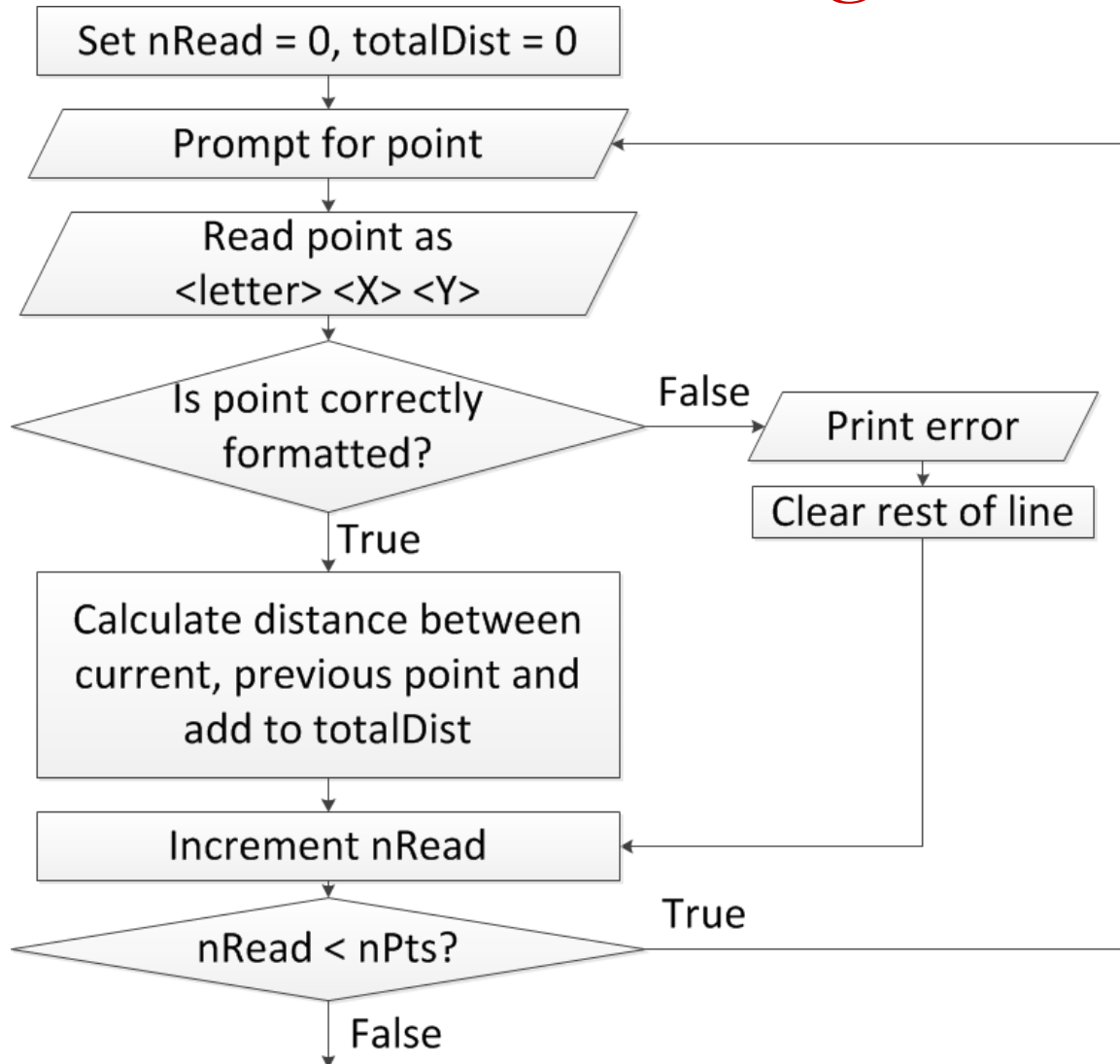
Flow charts: overall flow



Flow chart: reading total # points



Flow chart: reading list of points

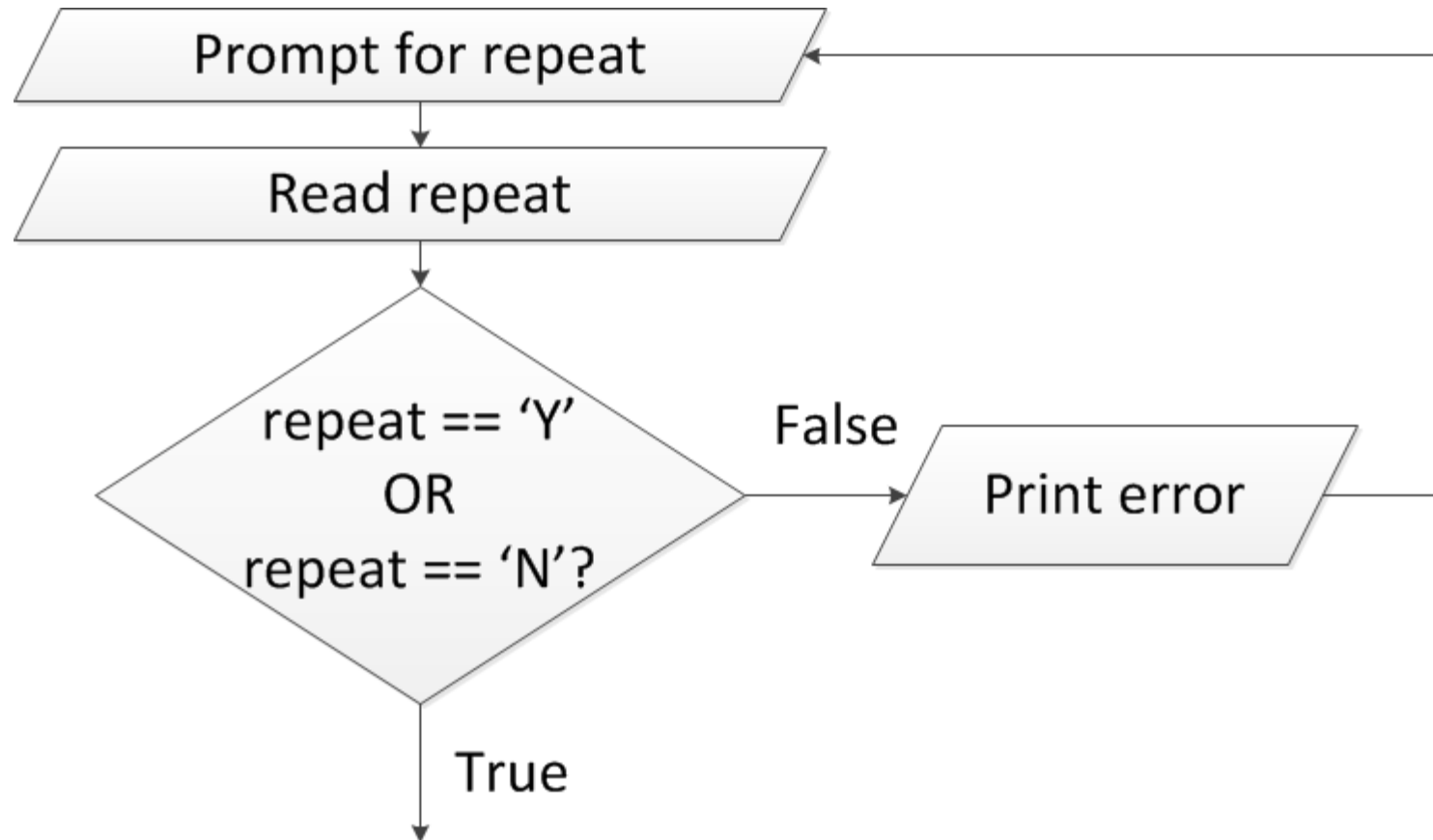


- As noted during lecture, this chart must change
 - Must account for storing valid points for future iterations

Completing program

- To be done today
 - Process for prompting user to enter new list
 - Translate flow charts to code

Flow chart: Asking user to repeat



Reading list of points

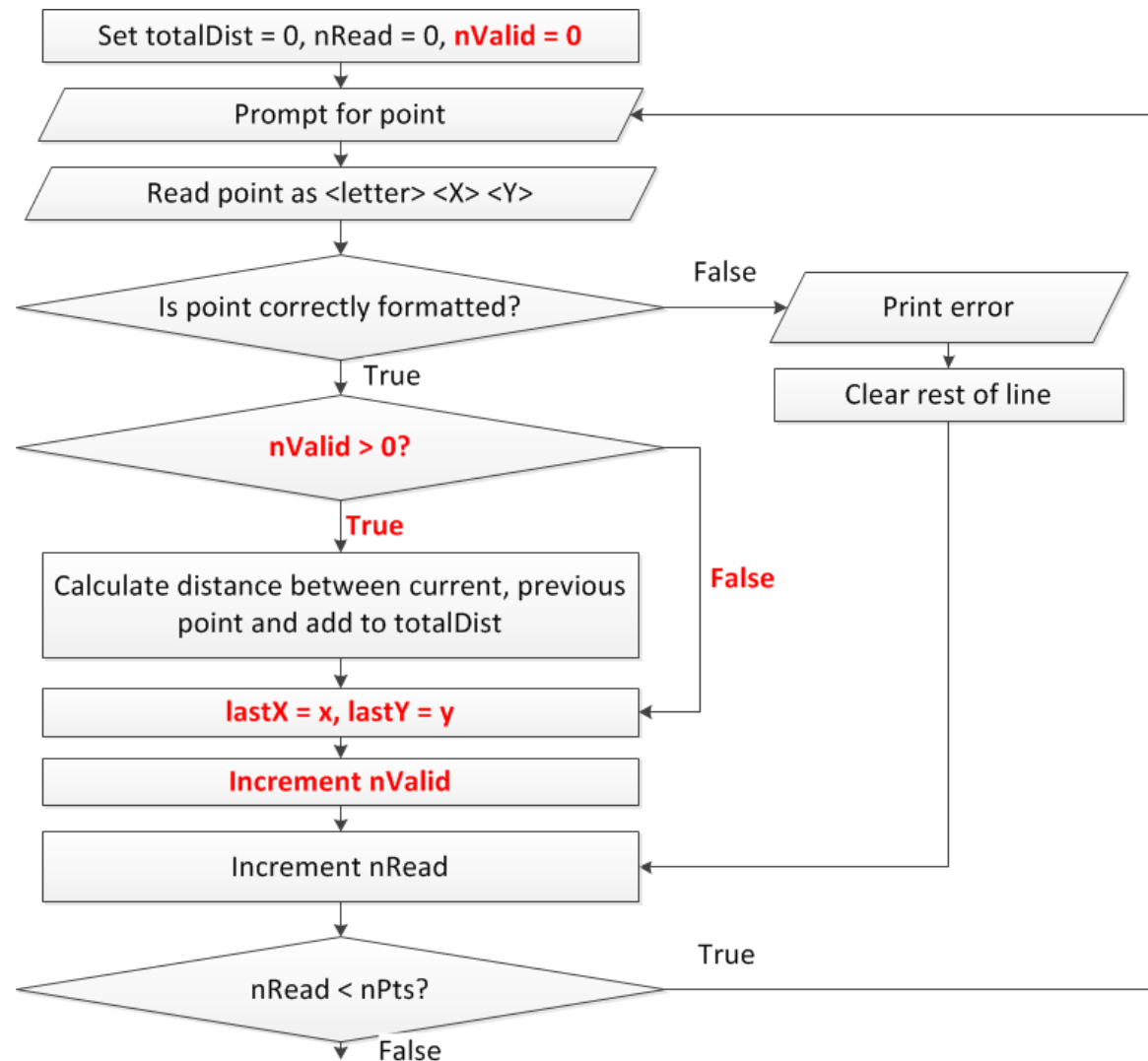
■ Issues

- In order to calculate distances, must be able to store (x, y) values from both current and previous iteration
- We can't calculate distance if we don't have at least two valid points → can't do if:
 - It's the first loop iteration
 - The new point isn't valid (correctly formatted)
 - All previous iterations produced invalid points

■ Solution: counter for # of valid points (`nValid`)

- Increment each time valid point is read
 - Store current point (x, y) for next iteration (`lastX`, `lastY`) under same conditions
- Only calculate distance if:
 - Current point is valid
 - We have at least one previously read valid point (`nValid > 0`)

Flow chart: reading list of points, #2



Character input

- One other issue: when reading point, likely using following scanf() call:
 - `scanf("%c %lf %lf", &letter, &x, &y);`
- %c format specifier will read any character
 - If previous input line was correctly formatted, next character left in input will be a newline!
 - Valid input example (newlines shown; input underlined):
Enter total # of points: 2\n
Enter a point: A 1 2\n
Enter a point: B 3 5\n
- Solution: clear newline after each valid input

Translating flow charts to code:

- Covered process for reading total # points on Friday
- Started process for handling single point
- See posted file (16216f11_PE3_soln.c) for rest of code

Next time

- Functions