coursera

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Optional Enrichment on Input and Output

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These exercises from our book *Computer Science: An Interdisciplinary Approach* are an opportunity to study in further depth what you have learned from the lectures.

1.5.5 Write a program that reads in a sequence of integers and prints both the integer that appears in a longest consecutive run and the length of that run. For example, if the input is 1 2 2 1 5 1 1 7 7 7 7 1 1, then your program should print Longest run: 4 consecutive 7s.

1.5.6 Write a filter that reads in a sequence of integers and prints the integers, removing repeated values that appear consecutively. For example, if the input is 1 2 2 1 5 1 1 7 7 7 7 1 1 1 1 1 1 1 1 1, your program should print 1 2 1 5 1 7 1.

1.5.7 Write a program that takes an integer command-line argument n, reads in n-1 distinct integers between 1 and n, and determines the missing value.

1.5.17 Write a program that reads in a sequence of real numbers between -1 and +1 and prints their average magnitude, average power, and the number of zero crossings. The average magnitude is the average of the absolute values of the data values. The average power is the average of the squares of the data values. The number of zero crossings is the number of times a data value transitions from a strictly negative number to a strictly positive number, or vice versa. These three statistics are widely used to analyze digital signals.

1.5.30 *Histogram.* Suppose that the standard input stream is a sequence of double values. Write a program that takes an integer n and two real numbers lo and hi as command-line arguments and uses StdDraw to plot a histogram of the count of the numbers in the standard input stream that fall in each of the n intervals defined by dividing (lo , hi) into n equal-sized intervals.

1.5.31 *Spirographs.* Write a program that takes three double command-line arguments R, r, and a and