Note: Use only the Java constructs found in Lewis/Loftus, unless explicit permission is given otherwise by the instructor or preceptors.

1. (16 points) Design and implement an application reads in a set of 200 grades into a two-dimensional array from a .txt file called studentanswers that represent the results from a test of 20 true-false questions for 100 students. Each row of the array represents the answers of one of the 100 students in the class. Each column represents the answers of each student to a specific question on the test. Each cell of the array contains either the Boolean value "true" or "false." Read in the values from a second .txt file called questionanswers to be stored in a second one-dimensional array of 20 Boolean values that represent the correct answers to the 20 questions. Your program should compute and print out the number of correct answers for each student in chart form, the number of students who got each of the 20 questions correct in chart form, the average quiz grade and the standard deviation of the grades.

The formula for the standard deviation where σ is the standard deviation and μ is the mean or average:

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

The next pages show what successful output should look like:

run:

STUDENT SCORES

Student 1 20	Student 2 19	Student 3 15	Student 4 16
Student 5 19	Student 6 20	Student 7 19	Student 8 15
Student 9 16	Student 10 19	Student 11 8	Student 12 16
Student 13 4	Student 14 16	Student 15 18	Student 16 20
Student 17 19	Student 18 15	Student 19 16	Student 20 19
Student 21 20	Student 22 19	Student 23 15	Student 24 16
Student 25 19	Student 26 20	Student 27 19	Student 28 15
Student 29 16	Student 30 19	Student 31 12	Student 32 10
Student 33 15	Student 34 5	Student 35 20	Student 36 19
Student 37 15	Student 38 16	Student 39 18	Student 40 20
Student 41 19	Student 42 15	Student 43 16	Student 44 20
Student 45 19	Student 46 20	Student 47 20	Student 48 19
Student 49 15	Student 50 16	Student 51 17	Student 52 16
Student 53 20	Student 54 18	Student 55 15	Student 56 17
Student 57 16	Student 58 6	Student 59 20	Student 60 17
Student 61 15	Student 62 20	Student 63 17	Student 64 20
Student 65 19	Student 66 15	Student 67 16	Student 68 19
Student 69 20	Student 70 13	Student 71 14	Student 72 20
Student 73 19	Student 74 17	Student 75 18	Student 76 19
Student 77 14	Student 78 5	Student 79 9	Student 80 12
Student 81 20	Student 82 19	Student 83 17	Student 84 16
Student 85 19	Student 86 10	Student 87 20	Student 88 19
Student 89 15	Student 90 16	Student 91 20	Student 92 17
Student 93 20	Student 94 19	Student 95 18	Student 96 18
Student 97 19	Student 98 17	Student 99 20	Student 100 20

NUMBER OF STUDENTS WHO ANSWERED QUESTION CORRECTLY

Question 1 95	Question 2 93	Question 3 93	Question 4 91
Question 5 93	Question 6 95	Question 7 93	Question 8 90
Question 9 93	Question 10 91	Question 11 91	Question 12 91
Question 13 91	Question 14 76	Question 15 91	Question 16 74
Question 17 76	Question 18 59	Question 19 65	Question 20 37

THE AVERAGE GRADE IS: 16.78
THE STANDARD DEVIATION OF THE QUIZ GRADES IS: 3.554

Extra Credit (2 points)

For extra credit, produce a bar graph of the distribution of letter grades for the quiz computed from the first table above. Your bar graph should be valid for any grade distribution.

Grades

Bar Graph of Student Grades

A's 90 - 100	
B's 80 - 89	
C's 70 - 79	
D's 60 - 69	
E's 0 - 59	

0 10 20 30 40 50 60 70 80 90 100

Number of Students