Program Description:

Coca-Cola is creating an automated quality control system. The company is looking for a software program to read a data file generated by the quality control analysis system and compute measures of central tendency and variation in volume recorded by the fluid level transmitter to determine whether or not the filler station is operating correctly.

Input: Name of Data File

Output: Filler ID, Date, Time, Batch Number, Number of Samples, Mean, Median, Mode, Variance, Standard Deviation, Maximum, Minimum, Number of Samples that Exceed Tolerances, Barcodes of Samples that Exceed Tolerances, Message if Filler Station is Not Operating Correctly

Model:

1. File contains *n* samples of data.
2. Median = middle value when *n* samples are ordered from least to greatest
3. Mean = (sum of *n* values) / *n*
4. Mode = value within *n* values that has the highest frequency
5. Variance = 1 / (*n* - 1) * sum of (sample(i) - mean) ^ 2
6. Standard Deviation = (variance) ^ 1/2
7. Maximum = largest value in *n* samples
8. Minimum = smallest value in *n* samples
9. Threshold for being acceptable = mean + 3 * |Standard Deviation| (Must be < 0.1 to be acceptable)

Algorithm:

(see last page)

Example:

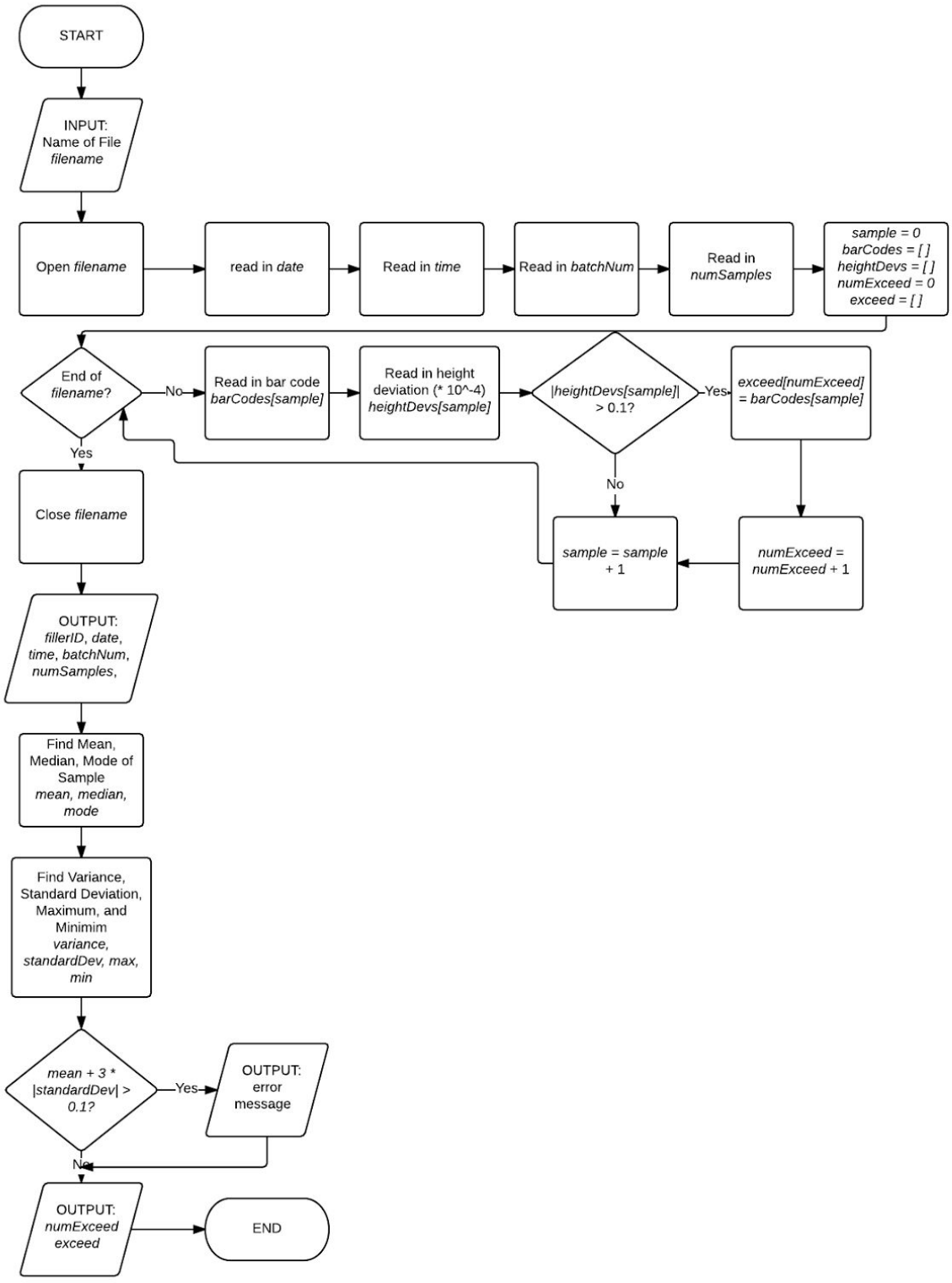
Data File: ‘file.txt’
Contents:
10 - JAN - 2012
21:31:55
24-96
0B9C1431 -0006 0B9C1492 -0156 0B9C2205 0788 0B9C2225 -1651
0B9C2389 -0089 0B9C2425 0782 0B9C2788 -0002 0B9C3041 -0031 0B9C3119 -0281
0B9C3225 -0081 0B9C3341 0780 0B9C3386 -0522 0B9C3399 -0999

1. INPUT: Name of File: ‘file.txt’

2. Open ‘file.txt’
3. date = 10 - JAN - 2012
4. time = 21: 31: 55
5. batchNum = 24
6. numSamples = 96
7. Sample = 0
8. barCodes = [ ]
9. heightDevs = [ ]
10. numExceed = 0
11. Exceed = [ ]
12. End of ‘file.txt’? (No)
13. barCodes[0] = 0B9C1431
14. heightDev[0] = -0.0006
15. |-0.0006 | > 0.1? (No)
16. Sample = 1
17. End of ‘file.txt’? (No)
18. barCodes[1] = 0B9C1492
19. heightDev[1] = -0.0156
20. |-0.0156| > 0.1? (No)
21. Sample = 2
22. End of ‘file.txt’? (No)
23. barCodes[2] = 0B9C2205
24. heightDev[2] = 0.0788
25. |0.0788| > 0.1? (No)
26. Sample = 3
27. End of ‘file.txt’? (No)
28. barCodes[3] = 0B9C2225
29. heightDev[3] = -0.1651
30. |-0.1651| > 0.1? (Yes)
31. exceed[0] = 0B9C2225
32. numExceed = 1
33. Sample = 4
34. End of ‘file.txt’? (No)
35. barCodes[4] = 0B9C2389
36. heightDev[4] = -0.0089
37. |-0.0089| > 0.1 (No)
38. Sample = 5
39. End of ‘file.txt’? (No)
40. barCodes[5] = 0B9C2425

41. heightDev[5] = 0.0782
42. |0.0782| > 0.1? (No)
43. Sample = 6
44. End of ‘file.txt’? (No)
45. barCodes[6] = 0B9C2788
46. heightDev[6] = -0.0002
47. |-0.0002| > 0.1? (No)
48. Sample = 7
49. End of ‘file.txt’? (No)
50. barCodes[7] = 0B9C3041
51. heightDev[7] = -0.0031
52. |-0.0031| > 0.1? (No)
53. Sample = 8
54. End of ‘file.txt’? (No)
55. barCodes[8] = 0B9C3119
56. heightDev[8] = -0.0281
57. |-0.0281| > 0.1? (No)
58. Sample = 9
59. End of ‘file.txt’? (No)
60. barCodes[9] = 0B9C3225
61. heightDev[9] = -0.0081
62. |-0.0081| > 0.1? (No)
63. Sample = 10
64. End of ‘file.txt’? (No)
65. barCodes[10] = 0B9C3341
66. heightDev[10] = 0.0780
67. |0.0780| > 0.1? (No)
68. Sample = 11
69. End of ‘file.txt’? (No)
70. barCodes[11] = 0B9C3386
71. heightDev[11] = -0.0522
72. |-0.0522| > 0.1? (No)
73. Sample = 12
74. End of ‘file.txt’? (No)
75. barCodes[12] = 0B9C3399
76. heightDev[12] = -0.0099
77. |-0.0099| > 0.1? (No)
78. Sample = 13
79. End of ‘file.txt’? (Yes)

80. Close ‘file.txt’
81. OUTPUT: fillerID = 0B9C
82. OUTPUT: date = 10 - JAN - 2012
83. OUTPUT: time = 21: 31: 55
84. OUTPUT: batchNum = 24
85. OUTPUT: numSamples = 96
86. OUTPUT: mean = sum(heightDev[0:12] / 13 = -0.0036
87. OUTPUT: median = -0.0081
88. OUTPUT: mode = none
89. OUTPUT: variance = 0.0048
90. OUTPUT: standardDev = 0.0695
91. OUTPUT: maximum = 0.0788
92. OUTPUT: minimum = -0.1651
93. (-0.0036) + 3 * |0.0695| > 0.1? (Yes)
94. OUTPUT: Error: The data is outside the threshold. Please recalibrate Fill Station 0B9C.
95. OUTPUT: numExceed = 1
96. OUTPUT: exceed = 0B9C2225
97. End of Program


START
INPUT: Name of File filename
Open filename
read in date
Read in time
Read in batchNum
Read in numSamples
sample = 0
barCodes = [ ]
heightDevs = [ ]
numExceed = 0
exceed = [ ]
End of filename?
No
Read in bar code barCodes[sample]
Read in height deviation (* 10^-4) heightDevs[sample]
|heightDevs[sample]| > 0.1?
Yes
exceed[numExceed] = barCodes[sample]
Yes
Close filename
No
sample = sample + 1
numExceed = numExceed + 1
OUTPUT: fillerID, date, time, batchNum, numSamples,
Find Mean, Median, Mode of Sample mean, median, mode
Find Variance, Standard Deviation, Maximum, and Minimim variance, standardDev, max, min
mean + 3 * |standardDev| > 0.1?
Yes
OUTPUT: error message
No
OUTPUT: numExceed exceed
END