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Data Structures and Algorithms II

Project 4

User’s Manual

Setup and Compilation

1. Download and unzip the file the maples.zip file from eLearning on a Linux, macOS, or windows machine.
2. The submission includes:

* historic.cpp
* historic.hpp
* generate.cpp
* generate.hpp
* t1.txt
* t2.txt
* t3.txt
* t4.txt
* main.cpp
* readings.txt
* usersManual.docx (this file)
* Makefile
* UML diagram

1. Environment: this program has been tested in the multi-platform lab and will run there.
2. Compiling: This program includes a Makefile. To use this open up the project directory on the command line and type make. It will create an executable called main, to run this simply type ./main and the program will start.
3. User Input: user input is not required to operate this program.
4. Output: The text on the following pages shows what should be output into the console.

Simulation: 1

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Number of batches: 100

Batch size: 2000

Percentage of datasets containing defective items: 24%

Percentage of defective items in a given dataset: 7%

number of items samples: 30

Created bad set batch #1, total Bad = 134 total = 2000 bad percent = 24

Created bad set batch #3, total Bad = 140 total = 2000 bad percent = 24

Created bad set batch #5, total Bad = 132 total = 2000 bad percent = 24

Created bad set batch #7, total Bad = 146 total = 2000 bad percent = 24

Created bad set batch #9, total Bad = 146 total = 2000 bad percent = 24

Created bad set batch #10, total Bad = 144 total = 2000 bad percent = 24

Created bad set batch #13, total Bad = 131 total = 2000 bad percent = 24

Created bad set batch #14, total Bad = 148 total = 2000 bad percent = 24

Created bad set batch #21, total Bad = 138 total = 2000 bad percent = 24

Created bad set batch #37, total Bad = 138 total = 2000 bad percent = 24

Created bad set batch #38, total Bad = 140 total = 2000 bad percent = 24

Created bad set batch #40, total Bad = 128 total = 2000 bad percent = 24

Created bad set batch #41, total Bad = 143 total = 2000 bad percent = 24

Created bad set batch #44, total Bad = 146 total = 2000 bad percent = 24

Created bad set batch #58, total Bad = 122 total = 2000 bad percent = 24

Created bad set batch #71, total Bad = 152 total = 2000 bad percent = 24

Created bad set batch #74, total Bad = 144 total = 2000 bad percent = 24

Created bad set batch #77, total Bad = 135 total = 2000 bad percent = 24

Created bad set batch #79, total Bad = 126 total = 2000 bad percent = 24

Created bad set batch #89, total Bad = 136 total = 2000 bad percent = 24

Created bad set batch #90, total Bad = 131 total = 2000 bad percent = 24

Created bad set batch #93, total Bad = 129 total = 2000 bad percent = 24

Created bad set batch #94, total Bad = 145 total = 2000 bad percent = 24

Created bad set batch #99, total Bad = 144 total = 2000 bad percent = 24

Created bad set batch #100, total Bad = 155 total = 2000 bad percent = 24

Number of bad sets: 25

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Analyzing Data Sets:

Batch #1 is bad

Batch #3 is bad

Batch #5 is bad

Batch #7 is bad

Batch #9 is bad

Batch #10 is bad

Batch #13 is bad

Batch #14 is bad

Batch #21 is bad

Batch #37 is bad

Batch #38 is bad

Batch #40 is bad

Batch #41 is bad

Batch #44 is bad

Batch #58 is bad

Batch #71 is bad

Batch #77 is bad

Batch #79 is bad

Batch #89 is bad

Batch #90 is bad

Batch #93 is bad

Batch #94 is bad

Batch #99 is bad

Batch #100 is bad

Base = 0.930000 Exponent = 30

P(failure to detect bad batch) = 0.113367

Percentage of bad batches actually detected = 96.00%

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Simulation: 2

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Number of batches: 100

Batch size: 2000

Percentage of datasets containing defective items: 10%

Percentage of defective items in a given dataset: 10%

number of items samples: 50

Created bad set batch #1, total Bad = 193 total = 2000 bad percent = 10

Created bad set batch #4, total Bad = 211 total = 2000 bad percent = 10

Created bad set batch #15, total Bad = 179 total = 2000 bad percent = 10

Created bad set batch #21, total Bad = 203 total = 2000 bad percent = 10

Created bad set batch #45, total Bad = 176 total = 2000 bad percent = 10

Created bad set batch #50, total Bad = 223 total = 2000 bad percent = 10

Created bad set batch #65, total Bad = 192 total = 2000 bad percent = 10

Created bad set batch #73, total Bad = 204 total = 2000 bad percent = 10

Created bad set batch #83, total Bad = 196 total = 2000 bad percent = 10

Created bad set batch #87, total Bad = 180 total = 2000 bad percent = 10

Number of bad sets: 10

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Analyzing Data Sets:

Batch #1 is bad

Batch #4 is bad

Batch #15 is bad

Batch #21 is bad

Batch #45 is bad

Batch #50 is bad

Batch #65 is bad

Batch #73 is bad

Batch #83 is bad

Batch #87 is bad

Base = 0.900000 Exponent = 50

P(failure to detect bad batch) = 0.005154

Percentage of bad batches actually detected = 100.00%

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Simulation: 3

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Number of batches: 500

Batch size: 1000

Percentage of datasets containing defective items: 5%

Percentage of defective items in a given dataset: 5%

number of items samples: 50

Created bad set batch #7, total Bad = 53 total = 1000 bad percent = 5

Created bad set batch #46, total Bad = 56 total = 1000 bad percent = 5

Created bad set batch #47, total Bad = 48 total = 1000 bad percent = 5

Created bad set batch #79, total Bad = 59 total = 1000 bad percent = 5

Created bad set batch #88, total Bad = 50 total = 1000 bad percent = 5

Created bad set batch #137, total Bad = 38 total = 1000 bad percent = 5

Created bad set batch #166, total Bad = 48 total = 1000 bad percent = 5

Created bad set batch #173, total Bad = 45 total = 1000 bad percent = 5

Created bad set batch #181, total Bad = 64 total = 1000 bad percent = 5

Created bad set batch #186, total Bad = 59 total = 1000 bad percent = 5

Created bad set batch #204, total Bad = 47 total = 1000 bad percent = 5

Created bad set batch #224, total Bad = 48 total = 1000 bad percent = 5

Created bad set batch #229, total Bad = 52 total = 1000 bad percent = 5

Created bad set batch #254, total Bad = 40 total = 1000 bad percent = 5

Created bad set batch #277, total Bad = 51 total = 1000 bad percent = 5

Created bad set batch #300, total Bad = 50 total = 1000 bad percent = 5

Created bad set batch #327, total Bad = 38 total = 1000 bad percent = 5

Created bad set batch #329, total Bad = 51 total = 1000 bad percent = 5

Created bad set batch #336, total Bad = 56 total = 1000 bad percent = 5

Created bad set batch #340, total Bad = 42 total = 1000 bad percent = 5

Created bad set batch #365, total Bad = 37 total = 1000 bad percent = 5

Created bad set batch #376, total Bad = 62 total = 1000 bad percent = 5

Created bad set batch #412, total Bad = 44 total = 1000 bad percent = 5

Created bad set batch #419, total Bad = 58 total = 1000 bad percent = 5

Created bad set batch #444, total Bad = 45 total = 1000 bad percent = 5

Created bad set batch #469, total Bad = 56 total = 1000 bad percent = 5

Created bad set batch #490, total Bad = 46 total = 1000 bad percent = 5

Created bad set batch #497, total Bad = 46 total = 1000 bad percent = 5

Created bad set batch #500, total Bad = 52 total = 1000 bad percent = 5

Number of bad sets: 29

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Analyzing Data Sets:

Batch #7 is bad

Batch #46 is bad

Batch #47 is bad

Batch #79 is bad

Batch #166 is bad

Batch #173 is bad

Batch #181 is bad

Batch #186 is bad

Batch #204 is bad

Batch #224 is bad

Batch #229 is bad

Batch #254 is bad

Batch #277 is bad

Batch #300 is bad

Batch #327 is bad

Batch #329 is bad

Batch #336 is bad

Batch #340 is bad

Batch #376 is bad

Batch #419 is bad

Batch #444 is bad

Batch #490 is bad

Batch #497 is bad

Batch #500 is bad

Base = 0.950000 Exponent = 50

P(failure to detect bad batch) = 0.076945

Percentage of bad batches actually detected = 82.76%

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Simulation: 4

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Number of batches: 500

Batch size: 1000

Percentage of datasets containing defective items: 1%

Percentage of defective items in a given dataset: 1%

number of items samples: 50

Created bad set batch #65, total Bad = 7 total = 1000 bad percent = 1

Created bad set batch #93, total Bad = 16 total = 1000 bad percent = 1

Created bad set batch #204, total Bad = 8 total = 1000 bad percent = 1

Created bad set batch #496, total Bad = 8 total = 1000 bad percent = 1

Number of bad sets: 4

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Analyzing Data Sets:

Batch #93 is bad

Batch #496 is bad

Base = 0.990000 Exponent = 50

P(failure to detect bad batch) = 0.605006

Percentage of bad batches actually detected = 50.00%

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Simulated Days: 100

Number of categories: 7

Ranges and occurrences in each range:

0-2000: 15

2000-4000: 25

4000-8000: 20

8000-12000: 15

12000-18000: 10

18000-24000: 10

24000-28000: 5

Units of measure: ml

Analytical model: 8500.00. Expected value is in the 8000-12000ml range.

Simulated model: 3071.14. Expected value is in the 2000-4000ml range.