**Jacob Rook**

**Data Structure and Algorithms II**

**Project 4**

**User’s Manual**

**Setup and Compilation:**

1. Download and unzip the submission from eLearning on a Linux box in the multi-platform lab.
2. The includes:
   1. rook-j-p4.c
   2. monteCarlo.c
   3. monteCarlo.h
   4. makefile
   5. FunctionalDecomposition.docx
   6. UsersManual.docx
   7. C1.txt
   8. C2.txt
   9. C3.txt
   10. C4.txt
   11. SimParameters.dat
   12. Ds\_Files(Folder)
   13. README.txt
3. Environment: This program was tested on a combination of the Eclipse and jGrasp IDE. However, also works in the schools ssh server.
4. Compiling. This program includes a makefile. At the command line in Linux in the folder with the extracted files, type make into the command line. The program produces an executable: rook-j-p4
5. **The user needs to make sure that there is a folder “ds\_Files” in the same directory of the code.** This is where the ds.txt files go.

**Running the program:** Issue the command ./rook-j-p4. No command line arguments are required or checked.

User input: Program is user interactive. At the beginning of the program the program will first ask the user if they would like to convert the SimParameter.txt to a binary file, if they have a text file needing to be converted. Then the program will continuously ask the user if they want to run the Monte Carlo simulation or algorithm and call the functions to do just that until the user enter the option to exit the program.

**Output:** All output goes to the console. Output will be similar to this:

Would you like to convert SimParameters.txt to a binary file? (y/n)n

Option Choice

1 Implement a Monte Carlo Simulation

2 Implement a Simple Monte Carlo Algorithm

3 Exit Program

Please enter an Option: 1

Simulation 1

N: 100

Simulated result: 4.00

Expected value: 3.33

Error percent: 20.000

Simulation 2

N: 200

Simulated result: 2.00

Expected value: 2.67

Error percent: 25.000

Simulation 3

N: 300

Simulated result: 2.00

Expected value: 2.00

Error percent: 0.000

Option Choice

1 Implement a Monte Carlo Simulation

2 Implement a Simple Monte Carlo Algorithm

3 Exit Program

Please enter an Option: 2

Running:

Number of Batches of Items: 100

Number of Items in Each Batch: 2000

Percentage of Batches Containing Bad Items: 24%

Percentage of Items that are bad in a bad set: 7%

Items Sampled from Each Set: 30

Generating Data Sets:

Create Bad Set Batch # 1, totBad = 142 Total = 2000 PercentBad = 7.10

Create Bad Set Batch # 2, totBad = 132 Total = 2000 PercentBad = 6.60

Create Bad Set Batch # 9, totBad = 118 Total = 2000 PercentBad = 5.90

Create Bad Set Batch # 22, totBad = 127 Total = 2000 PercentBad = 6.35

Create Bad Set Batch # 27, totBad = 132 Total = 2000 PercentBad = 6.60

Create Bad Set Batch # 28, totBad = 130 Total = 2000 PercentBad = 6.50

Create Bad Set Batch # 32, totBad = 150 Total = 2000 PercentBad = 7.50

Create Bad Set Batch # 50, totBad = 134 Total = 2000 PercentBad = 6.70

Create Bad Set Batch # 51, totBad = 124 Total = 2000 PercentBad = 6.20

Create Bad Set Batch # 53, totBad = 137 Total = 2000 PercentBad = 6.85

Create Bad Set Batch # 57, totBad = 138 Total = 2000 PercentBad = 6.90

Create Bad Set Batch # 58, totBad = 133 Total = 2000 PercentBad = 6.65

Create Bad Set Batch # 63, totBad = 134 Total = 2000 PercentBad = 6.70

Create Bad Set Batch # 64, totBad = 154 Total = 2000 PercentBad = 7.70

Create Bad Set Batch # 65, totBad = 156 Total = 2000 PercentBad = 7.80

Create Bad Set Batch # 67, totBad = 148 Total = 2000 PercentBad = 7.40

Create Bad Set Batch # 70, totBad = 126 Total = 2000 PercentBad = 6.30

Create Bad Set Batch # 75, totBad = 160 Total = 2000 PercentBad = 8.00

Create Bad Set Batch # 77, totBad = 147 Total = 2000 PercentBad = 7.35

Create Bad Set Batch # 83, totBad = 150 Total = 2000 PercentBad = 7.50

Create Bad Set Batch # 84, totBad = 136 Total = 2000 PercentBad = 6.80

Create Bad Set Batch # 85, totBad = 137 Total = 2000 PercentBad = 6.85

Create Bad Set Batch # 97, totBad = 142 Total = 2000 PercentBad = 7.10

Total Bad Sets = 23

Running:

Number of Batches of Items: 100

Number of Items in Each Batch: 2000

Percentage of Batches Containing Bad Items: 10%

Percentage of Items that are bad in a bad set: 10%

Items Sampled from Each Set: 50

Generating Data Sets:

Create Bad Set Batch # 1, totBad = 197 Total = 2000 PercentBad = 9.85

Create Bad Set Batch # 2, totBad = 186 Total = 2000 PercentBad = 9.30

Create Bad Set Batch # 11, totBad = 186 Total = 2000 PercentBad = 9.30

Create Bad Set Batch # 26, totBad = 179 Total = 2000 PercentBad = 8.95

Create Bad Set Batch # 27, totBad = 194 Total = 2000 PercentBad = 9.70

Create Bad Set Batch # 39, totBad = 185 Total = 2000 PercentBad = 9.25

Create Bad Set Batch # 60, totBad = 217 Total = 2000 PercentBad = 10.85

Create Bad Set Batch # 70, totBad = 177 Total = 2000 PercentBad = 8.85

Create Bad Set Batch # 87, totBad = 180 Total = 2000 PercentBad = 9.00

Create Bad Set Batch # 91, totBad = 187 Total = 2000 PercentBad = 9.35

Total Bad Sets = 10

Running:

Number of Batches of Items: 500

Number of Items in Each Batch: 1000

Percentage of Batches Containing Bad Items: 10%

Percentage of Items that are bad in a bad set: 10%

Items Sampled from Each Set: 50

Generating Data Sets:

Create Bad Set Batch # 1, totBad = 88 Total = 1000 PercentBad = 8.80

Create Bad Set Batch # 20, totBad = 111 Total = 1000 PercentBad = 11.10

Create Bad Set Batch # 29, totBad = 99 Total = 1000 PercentBad = 9.90

Create Bad Set Batch # 39, totBad = 87 Total = 1000 PercentBad = 8.70

Create Bad Set Batch # 42, totBad = 97 Total = 1000 PercentBad = 9.70

Create Bad Set Batch # 54, totBad = 89 Total = 1000 PercentBad = 8.90

Create Bad Set Batch # 78, totBad = 90 Total = 1000 PercentBad = 9.00

Create Bad Set Batch # 92, totBad = 90 Total = 1000 PercentBad = 9.00

Create Bad Set Batch # 93, totBad = 96 Total = 1000 PercentBad = 9.60

Create Bad Set Batch # 98, totBad = 96 Total = 1000 PercentBad = 9.60

Create Bad Set Batch # 99, totBad = 94 Total = 1000 PercentBad = 9.40

Create Bad Set Batch #109, totBad = 88 Total = 1000 PercentBad = 8.80

Create Bad Set Batch #113, totBad = 106 Total = 1000 PercentBad = 10.60

Create Bad Set Batch #131, totBad = 112 Total = 1000 PercentBad = 11.20

Create Bad Set Batch #141, totBad = 96 Total = 1000 PercentBad = 9.60

Create Bad Set Batch #150, totBad = 82 Total = 1000 PercentBad = 8.20

Create Bad Set Batch #166, totBad = 96 Total = 1000 PercentBad = 9.60

Create Bad Set Batch #174, totBad = 85 Total = 1000 PercentBad = 8.50

Create Bad Set Batch #181, totBad = 97 Total = 1000 PercentBad = 9.70

Create Bad Set Batch #190, totBad = 88 Total = 1000 PercentBad = 8.80

Create Bad Set Batch #195, totBad = 98 Total = 1000 PercentBad = 9.80

Create Bad Set Batch #196, totBad = 95 Total = 1000 PercentBad = 9.50

Create Bad Set Batch #198, totBad = 97 Total = 1000 PercentBad = 9.70

Create Bad Set Batch #200, totBad = 95 Total = 1000 PercentBad = 9.50

Create Bad Set Batch #212, totBad = 97 Total = 1000 PercentBad = 9.70

Create Bad Set Batch #220, totBad = 93 Total = 1000 PercentBad = 9.30

Create Bad Set Batch #223, totBad = 113 Total = 1000 PercentBad = 11.30

Create Bad Set Batch #240, totBad = 114 Total = 1000 PercentBad = 11.40

Create Bad Set Batch #241, totBad = 108 Total = 1000 PercentBad = 10.80

Create Bad Set Batch #243, totBad = 116 Total = 1000 PercentBad = 11.60

Create Bad Set Batch #264, totBad = 78 Total = 1000 PercentBad = 7.80

Create Bad Set Batch #270, totBad = 120 Total = 1000 PercentBad = 12.00

Create Bad Set Batch #276, totBad = 89 Total = 1000 PercentBad = 8.90

Create Bad Set Batch #283, totBad = 103 Total = 1000 PercentBad = 10.30

Create Bad Set Batch #292, totBad = 117 Total = 1000 PercentBad = 11.70

Create Bad Set Batch #294, totBad = 87 Total = 1000 PercentBad = 8.70

Create Bad Set Batch #297, totBad = 110 Total = 1000 PercentBad = 11.00

Create Bad Set Batch #302, totBad = 96 Total = 1000 PercentBad = 9.60

Create Bad Set Batch #303, totBad = 99 Total = 1000 PercentBad = 9.90

Create Bad Set Batch #309, totBad = 104 Total = 1000 PercentBad = 10.40

Create Bad Set Batch #326, totBad = 102 Total = 1000 PercentBad = 10.20

Create Bad Set Batch #332, totBad = 90 Total = 1000 PercentBad = 9.00

Create Bad Set Batch #337, totBad = 104 Total = 1000 PercentBad = 10.40

Create Bad Set Batch #342, totBad = 87 Total = 1000 PercentBad = 8.70

Create Bad Set Batch #352, totBad = 89 Total = 1000 PercentBad = 8.90

Create Bad Set Batch #359, totBad = 113 Total = 1000 PercentBad = 11.30

Create Bad Set Batch #362, totBad = 100 Total = 1000 PercentBad = 10.00

Create Bad Set Batch #365, totBad = 101 Total = 1000 PercentBad = 10.10

Create Bad Set Batch #404, totBad = 103 Total = 1000 PercentBad = 10.30

Create Bad Set Batch #411, totBad = 95 Total = 1000 PercentBad = 9.50

Create Bad Set Batch #419, totBad = 114 Total = 1000 PercentBad = 11.40

Create Bad Set Batch #421, totBad = 92 Total = 1000 PercentBad = 9.20

Create Bad Set Batch #423, totBad = 114 Total = 1000 PercentBad = 11.40

Create Bad Set Batch #427, totBad = 97 Total = 1000 PercentBad = 9.70

Create Bad Set Batch #433, totBad = 108 Total = 1000 PercentBad = 10.80

Create Bad Set Batch #442, totBad = 102 Total = 1000 PercentBad = 10.20

Create Bad Set Batch #469, totBad = 87 Total = 1000 PercentBad = 8.70

Create Bad Set Batch #481, totBad = 103 Total = 1000 PercentBad = 10.30

Create Bad Set Batch #485, totBad = 97 Total = 1000 PercentBad = 9.70

Create Bad Set Batch #486, totBad = 89 Total = 1000 PercentBad = 8.90

Create Bad Set Batch #500, totBad = 109 Total = 1000 PercentBad = 10.90

Total Bad Sets = 61

Running:

Number of Batches of Items: 500

Number of Items in Each Batch: 1000

Percentage of Batches Containing Bad Items: 1%

Percentage of Items that are bad in a bad set: 1%

Items Sampled from Each Set: 50

Generating Data Sets:

Create Bad Set Batch # 1, totBad = 7 Total = 1000 PercentBad = 0.70

Create Bad Set Batch #114, totBad = 9 Total = 1000 PercentBad = 0.90

Create Bad Set Batch #222, totBad = 9 Total = 1000 PercentBad = 0.90

Create Bad Set Batch #235, totBad = 8 Total = 1000 PercentBad = 0.80

Create Bad Set Batch #243, totBad = 9 Total = 1000 PercentBad = 0.90

Total Bad Sets = 5

Run 0:

Number of Batches of Items: 100

Number of Items in Each Batch: 2000

Percentage of Batches Containing Bad Items: 24

Percentage of Items that are Bad in a Bad Set: 7

Items Sampled from Each Set: 30

Base = -6.00 Exponent = 30

P(Failure to Detect Bad Item) = 0.113367

P(Batch is Good) = 0.886633

Percentage of Bad Batches Detected = 37120048%

Run 1:

Number of Batches of Items: 100

Number of Items in Each Batch: 2000

Percentage of Batches Containing Bad Items: 10

Percentage of Items that are Bad in a Bad Set: 10

Items Sampled from Each Set: 50

Base = -9.00 Exponent = 50

P(Failure to Detect Bad Item) = 0.005154

P(Batch is Good) = 0.994846

Percentage of Bad Batches Detected = 32764%

Run 2:

Number of Batches of Items: 500

Number of Items in Each Batch: 1000

Percentage of Batches Containing Bad Items: 10

Percentage of Items that are Bad in a Bad Set: 10

Items Sampled from Each Set: 50

Base = -9.00 Exponent = 50

P(Failure to Detect Bad Item) = 0.005154

P(Batch is Good) = 0.994846

Percentage of Bad Batches Detected = 4196784%

Run 3:

Number of Batches of Items: 500

Number of Items in Each Batch: 1000

Percentage of Batches Containing Bad Items: 1

Percentage of Items that are Bad in a Bad Set: 1

Items Sampled from Each Set: 50

Base = 0.00 Exponent = 50

P(Failure to Detect Bad Item) = 0.605006

P(Batch is Good) = 0.394994

Percentage of Bad Batches Detected = 300%

Option Choice

1 Implement a Monte Carlo Simulation

2 Implement a Simple Monte Carlo Algorithm

3 Exit Program

Please enter an Option: 3