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Data Structures 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 submission includes:
    - file.cpp
    - file.hpp
    - main.cpp
    - Makefile
    - monteCarlo1.cpp
    - monteCarlo1.hpp
    - monteCarlo2.cpp
    - monteCarlo2.hpp
    - readings.dat
    - Makefile
    - spec.cpp
    - spec.hpp
    - t1.dat
    - t2.dat
    - t3.dat
    - t4.dat
    - umlDiagram.pdf
    - usersManual.pdf (this document)

3. Environment: This program has been tested in the multi-platform lab and will run there.

4. Compiling: This program includes a `Makefile`. At the command line in Linux, type `make`. The program produces an executable entitled `main`.

Running the program: Be sure `t1.dat`, `t2.dat`, `t3.dat`, `t4.dat`, and `readings.dat` are in the same directory as the executable. Issue the command `./main` to execute the program. No command line arguments are required or checked.

User input: No user interaction with the program is required.

Output: Output will go to the console. Output to console will be similar to this:

```
PART 1

Simulation 1:
.
.
Simulation 2:
.
.
Simulation 3:
.
.
Simulation 4:
    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:

     Bad Set Batch #   Total Bad   Total Items   % Bad
     -------------------------------------------------
           0               8          1000        1
         100              11          1000        1
         200              13          1000        1
         300               9          1000        1
         400              13          1000        1

     Total bad sets = 5

Analyzing Data Sets:

     Batch #200 is bad
     Batch #300 is bad

Base: 0.990000, Exponent = 50
P(failure to detect bad batch) = 0.605006
Percentage of bad batches actually detected = 40.00%
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PART 2

     Simulated days: 100
     Number of categories: 7
     Ranges and occurrences in each range:

          Range     Historical Data     Simulated Data
     -------------------------------------------------
       0-2000              15                 17
       2000-4000           25                 30
       4000-8000           20                 17
       8000-12000          15                 10
       12000-18000         10                  4
       18000-24000         10                 17
       24000-28000          5                  5

     Units of measure: ml

     Analytical: 8500.00. Expected value is in the 8000-12000/ml range.
     Simulation: 8560.00. Simulated value is in the 8000-12000/ml range.
```