

SADS 2020 Problem Sheet #2

Problem 2.1: *program to calculate basic statistics*

(3+2+2 = 7 points)

In the class room, we developed a function (plus unit tests) to calculate basic statistics for an array of numbers. Your task is to write a frontend that reads space separated values from the standard input and calculates basic statistics. Here is an example invocation:

```
$ printf "1 2 3\n4 5 6\n7 8 9\n" | ./src/ds mean 0 mean 1 mean 2  
4 5 6
```

This shell command feeds the input

```
1 2 3  
4 5 6  
7 8 9
```

into the program `ds` and the program outputs the mean of the 0th column, the mean of the 1st column, and the mean of the 3rd column. Here is another example using the same input data:

```
$ printf "1 2 3\n4 5 6\n7 8 9\n" | ./src/ds min 0 max 0 min 1 max 1 min 2 max 2  
1 7 2 8 3 9
```

The implementation work can be divided into the following tasks:

- Parse the input into a collection of vectors of numbers.
- Process the command line options to calculate the requested statistics.
- Suitable handling of any error conditions.

Problem 2.2: *fuzzing using american fuzzy lop*

(1+1+1 = 3 points)

In this step you fuzz the program you have written. Use the american fuzzy lop fuzzer to instrument your code. Define suitable input seems. Report any crashes found by the fuzzer and discuss the programming error that lead to the bug. If the fuzzer does not find any crashes, report (e.g., via a screenshot) how long you have been running the fuzzer without breaking your program.

- Describe how you instrumented your code.
- Describe how you prepared your seed test cases.
- Describe any problems that were found by the fuzzer in your code.