Android bug stars and resolution time

MSR 2012 Challenge

Android bug stars and resolution time
Introduction

Android BTS:

"If you find your issue and it's important to you, star it! That's how we know which bugs are most important to fix"

Source:
http://source.android.com/source/report-bugs.html

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Introduction

Android OS Project BTS:

- Users may subscribe to bugs
- The system scores a star to a bug each time a user subscribes to that particular bug

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Introduction

Then:

1. Are the most starred bugs solved faster?

2. Do developers assign more priority to the bugs that have more stars?

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Methodology

Data gathering

- Raw data from 9th MSR
- Java application to filter the XML with the BTS data
  - Got only closed bugs
  - Extracts stars, priority and resolution time
  - Time resolution in seconds
  - Output format: text file, 1 bug per row, info in columns

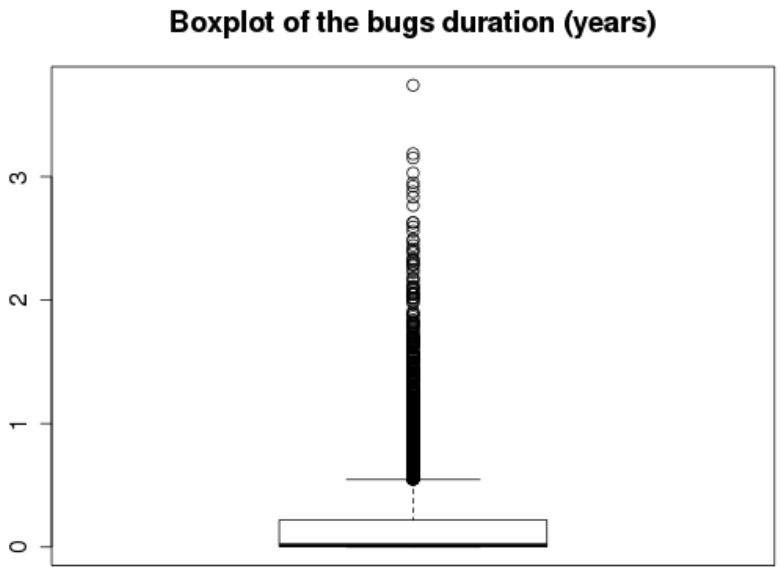
Android bug stars and resolution time
Methodology

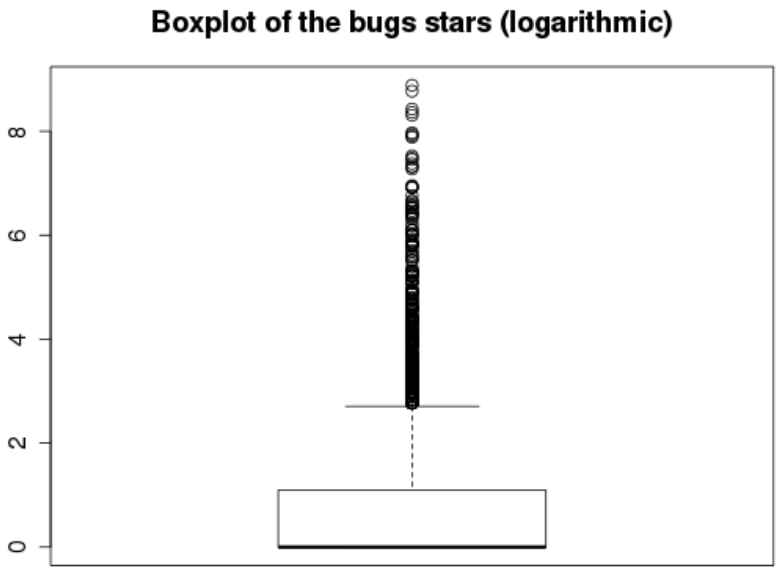
Statistical analysis

- GNU R
- Validate two hypotheses
  - (1) Time to solve a bug depends on its number of subscribers
  - (2) Priority assigned by the developers to a bug depends on its number of subscribers

Android bug stars and resolution time
Hypothesis validation (1)

Boxplot of the time to close bugs and the number of bug stars





Android bug stars and resolution time
Hypothesis validation (1)

Variables parameters

```
Stars
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   0.00    1.00    1.00   16.39    3.00 1234.00
Standard deviation: 184.491556881241
```

As can be seen, most of the stars are under a value of 3.

```
Duration (years)
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
0.000001 0.001417 0.016362 0.198503 0.219907 3.741755
Standard deviation: 11811207.4952566
```

Most of the bugs are solved very early.

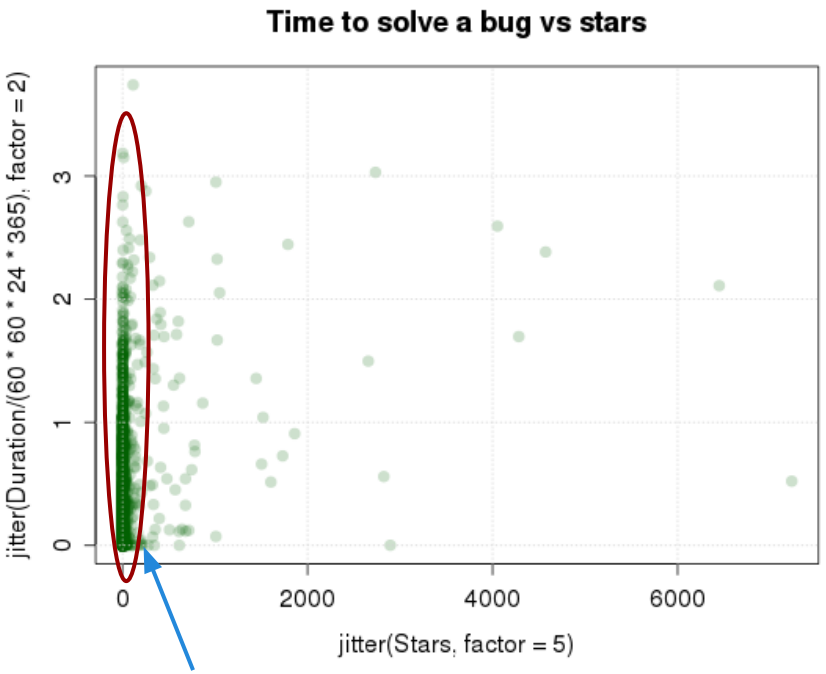
```
Type
     Defect Enhancement
       5494         850
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  1.000   1.000   1.000   1.134   1.000   2.000
Standard deviation: 0.340662906572986
```

```
Priority
 Blocker Critical     High   Medium    Small
       1       10       25     6283       25
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  1.000   4.000   4.000   3.996   4.000   5.000
Standard deviation: 0.124878382661632
```

The bugs priority is a constant with a value of 4.

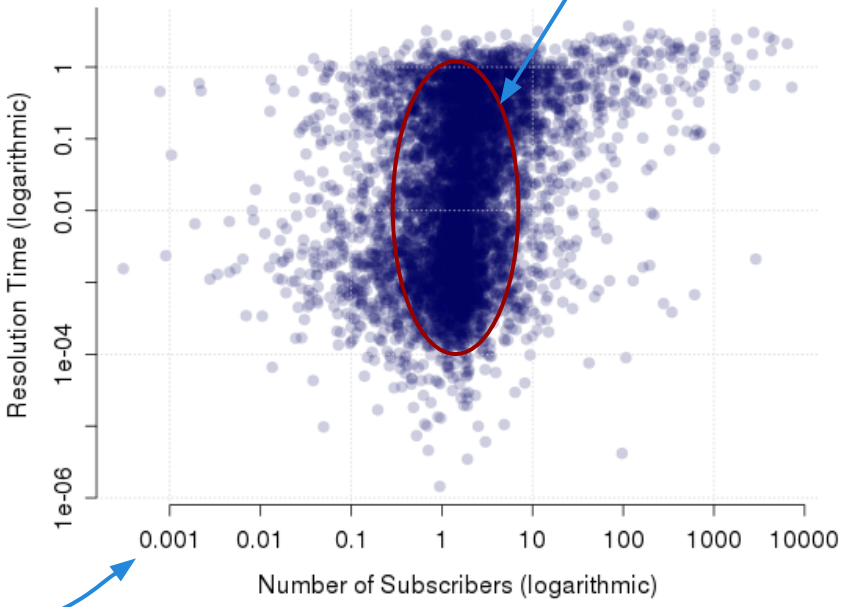
Android bug stars and resolution time
Hypothesis validation (1)

Relation between resolution time and number of subscribers



Here we don't have enough resolution, so we decided to use logarithmic axis

Don't seem to have any relation



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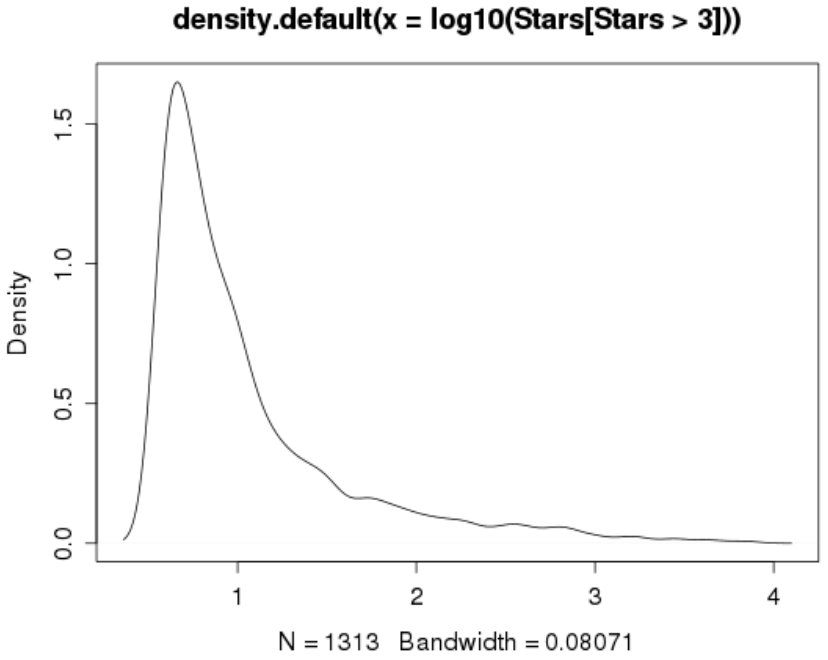
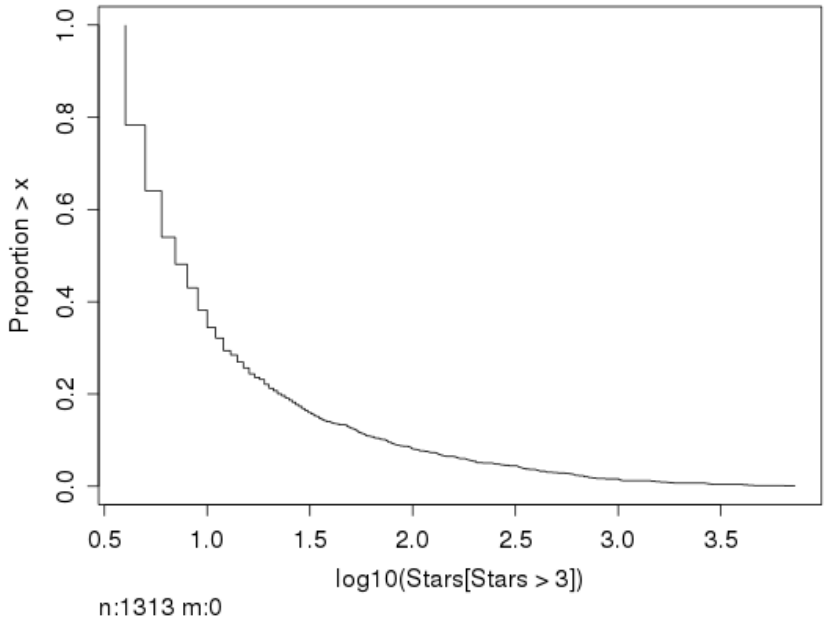
Hypothesis validation (1)

Left figure shows the density function of the logarithm of the number of bug stars, filtering the stars with a value under 3.

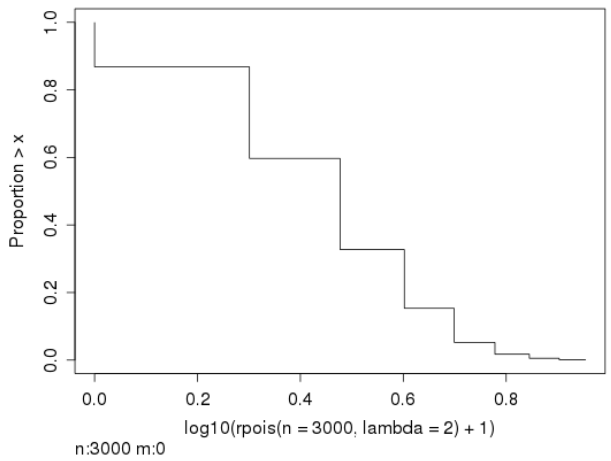
Right figures shows the inverse of the cumulative distribution function of the resolution time

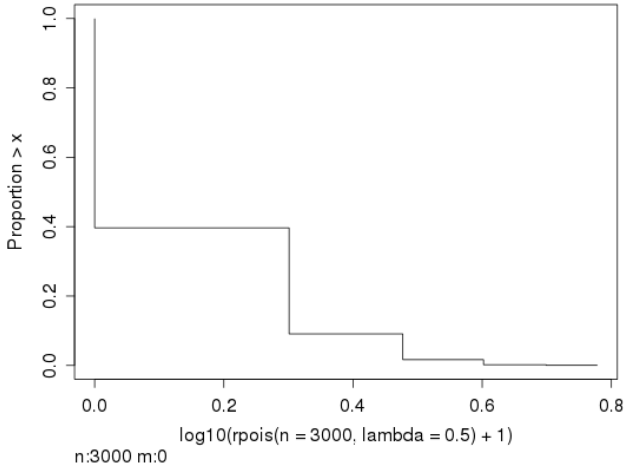


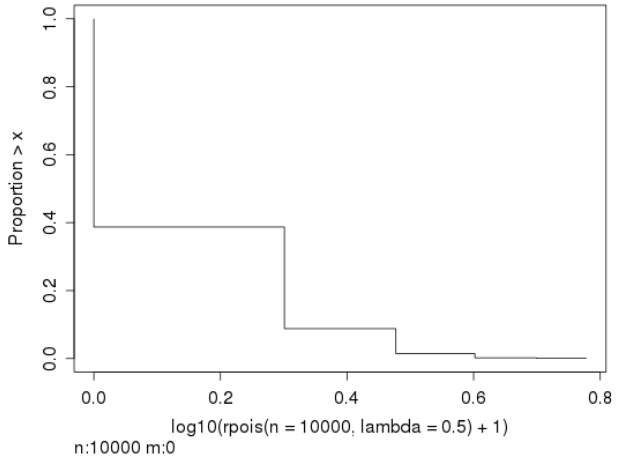


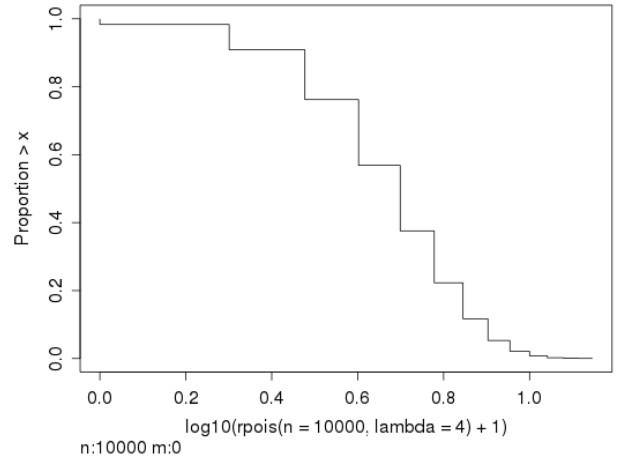
Android bug stars and resolution time
Hypothesis validation (1)

None of the tested distributions fixes with the resolution time variable.



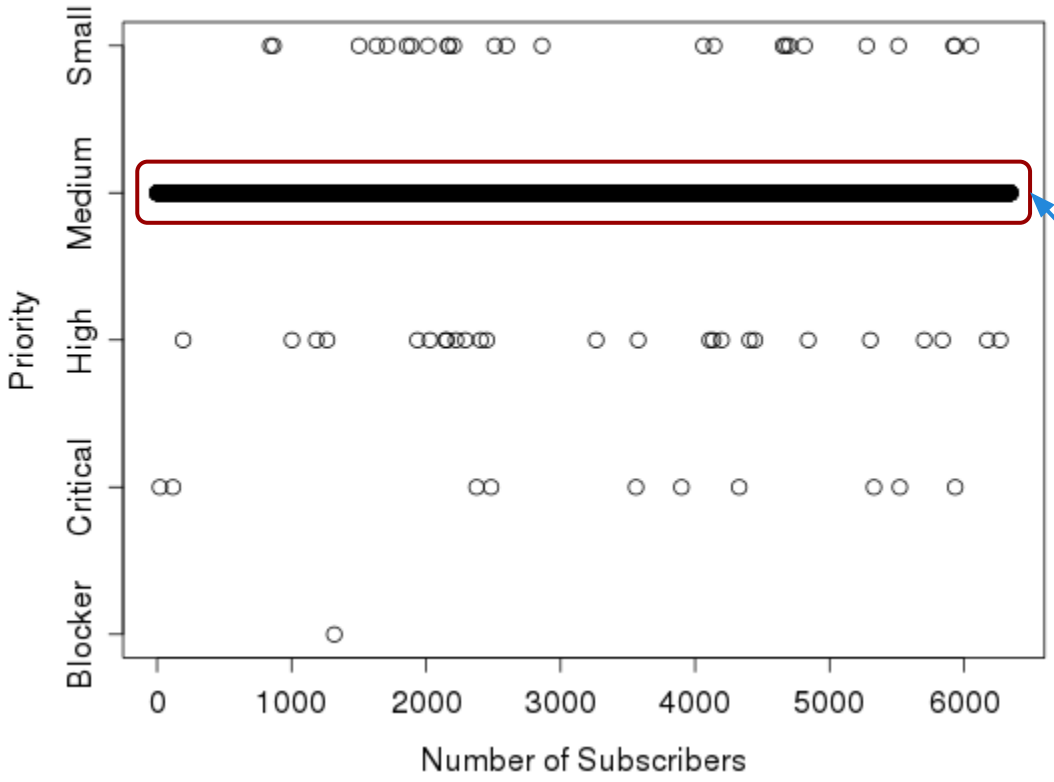






Android bug stars and resolution time
Hypothesis validation (2)

Relation between the bugs priority and its number of subscribers



Can be easily seen that the priority is a constant of value "Medium", so there is no relation between both variables

Android bug stars and resolution time
Threats to validity

Main threat to external validity:

The actual veracity of the values provided by the tracker:

- Several systems keeping track of the bugs of the operating system
    - Some are kept private by Google.

Android bug stars and resolution time
Conclusions and further work

1. Almost all bugs registered in the public Android tracker have the same priority

2. There is no relation between the resolution time and the number of subscribers of the bugs.

The End

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