

# Improving Bug Tracking Systems

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## THE PROBLEM



Bugzilla has **many question fields** to fill in for a bug report. Not all need to be answered for each bug, but **different ones for different bugs**. Which?

Alice submits new bug report

#187549  
Product: Platform  
Component: Search  
Version: 3.4.2  
Platform: Macintosh  
URL: ???  
... ..

Jack reads the bug report, has more questions.

Alice reads comment, sends response

Comment #1: Are you on a 64-bit architecture?  
Were you debugging?



In general, **two out of three [1]** questions get answered.

Comment #2: I'm not sure. MacBook Pro from 2006?  
No, not debugging.



Developer has to **wait for a response**. Most questions are answered within 1 day, but **some are open for years [1]**.

[1] "Frequently Asked Questions in Bug Reports". Technical Report, University of Calgary, March 2009.

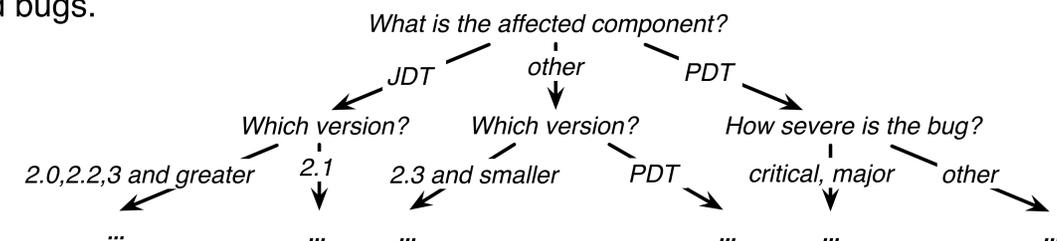
## THE SOLUTION

Formulate a **set of general questions**; each question asks for information that developers use to find the location of a bug.

What is the affected component?  
Which plugins do you have installed?  
Does downgrading to an earlier version solve the problem?  
On what operating system does it occur?  
How severe is the bug?

What platforms are affected?  
Can you provide a screenshot?  
How important is the bug?  
Which version is affected?  
...

Derive a **decision tree** from question/answer-pairs and bug locations for a large number of fixed bugs.



Gather information from the user guided by the decision tree. As we traverse the decision tree, the bug location's **search space is narrowed down**.

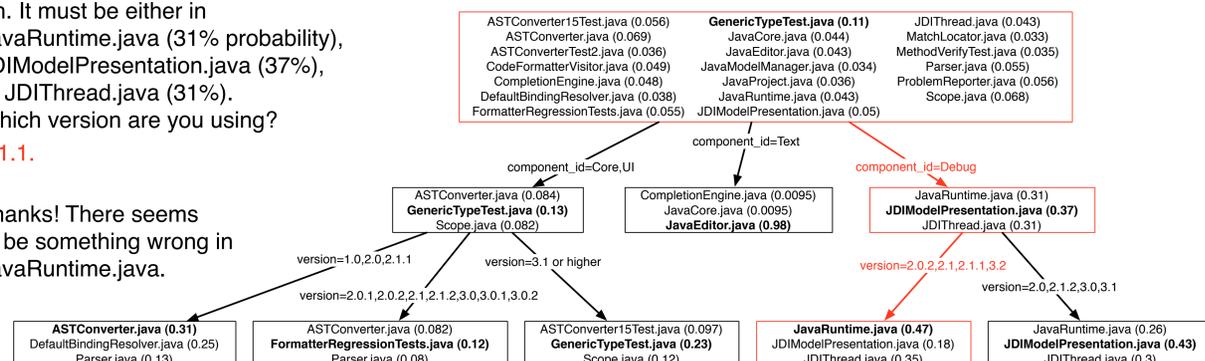
## FIRST RESULTS

**Traversing derived decision tree:** trained with 2875 bug reports from ECLIPSE JDK, bug reports related to 20 most frequently fixed files, considering only 20 most active reporters

What is the affected component?  
Debug.

Ah. It must be either in JavaRuntime.java (31% probability), JDIModelPresentation.java (37%), or JDIThread.java (31%).  
Which version are you using?  
2.1.1.

Thanks! There seems to be something wrong in JavaRuntime.java.



## THE FUTURE?

Alice ... A Real Person  
Bob ... A Bug-Tracking System

My ECLIPSE crashed.  
What did you do?  
I clicked on File → New Project and OK.  
Did you choose a Java project?  
No.  
... (a few questions later)

Thanks, Alice. The bug is likely in ProjectCreator.java and we will fix it soon.

## NEXT STEPS

- 1 Identify information needs in large sample of bug reports to compile a **catalogue of questions** to use in an expert system.
- 2 Using the catalogue, collect answers and defect locations for another large sample of bug reports; use it to **train a prediction model**.
- 3 Evaluate predictions and conduct **usability studies**.

THANKS FOR STOPPING BY!