A Gaze-Based Exploratory Study on the Information Seeking Behavior of Developers on Stack Overflow

YOUNGSTOWN STATE UNIVERSITY
Computer Science & Information Systems

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Youngstown State University

Project Id: 255
Registration Number: 176401

CRA-W
Computing Research Association
Women

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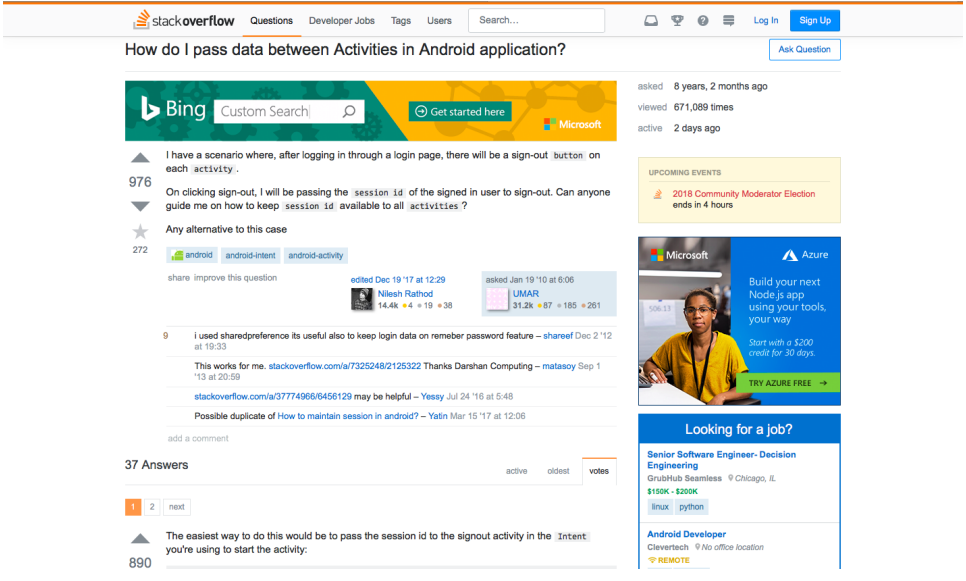
Motivation

Motivation

- Stack Overflow is a widely used website used by developers
- Much research done on predictive techniques
  - Gender, question and answer quality
- Very little research on how developers use Stack Overflow

Stack Overflow Question



Research Questions

Research Questions

- What parts of the Stack Overflow questions and answers do developers focus on most?

- How do developers navigate between and within Stack Overflow posts and the code editor in order to finish working on their task?

Methodology

Design Overview

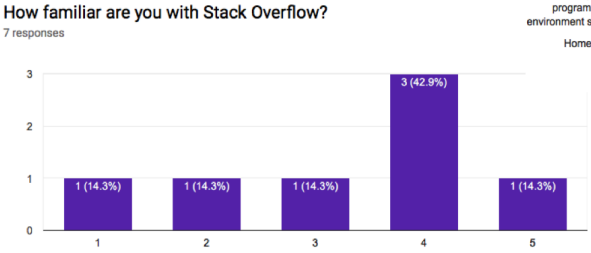
- Participants were shown 4 API elements (method or class)
- The task was to summarize each of the API elements
  - Two from Android system, two from Eclipse
- They were given source code of the above systems
- They could freely search on Stack Overflow to help complete the task

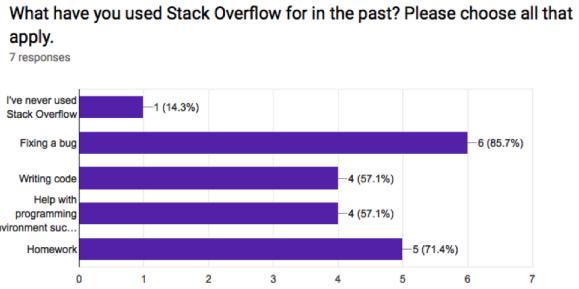
Data Collection

- Used iTrace (developed by the SERESLab in the CSIS department)
  - Integrates eye tracking into developer work environments
  - Supports scrolling and file switching
  - Supports eye tracking for Stack Overflow documents
  - Gaze location, pupil dilation, token, and others
- Screen recording
- Demographics in pre- and post-questionnaire

Participants

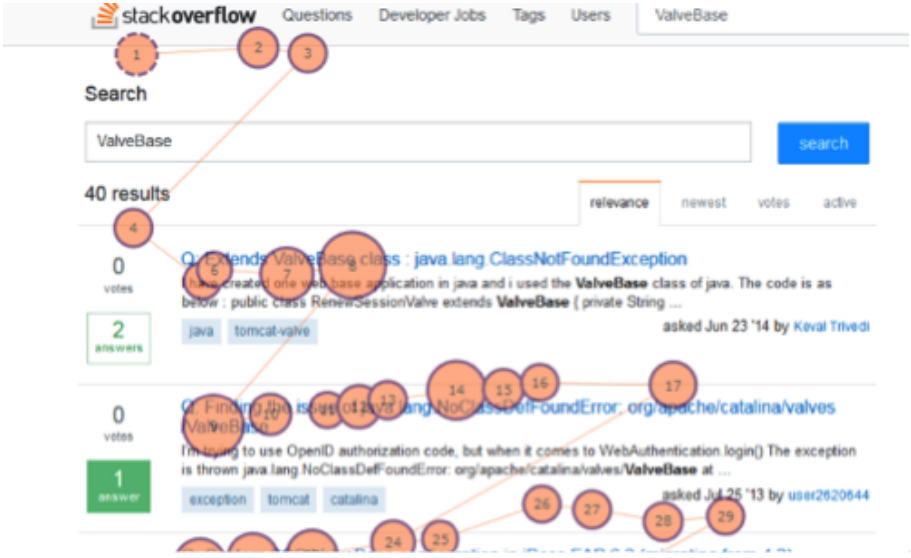
- Students in the CSIS Department
- Pilot study with 3 participants
  - Completed with more people since initial results
- All completed advanced CS courses





Results

Gaze Plot

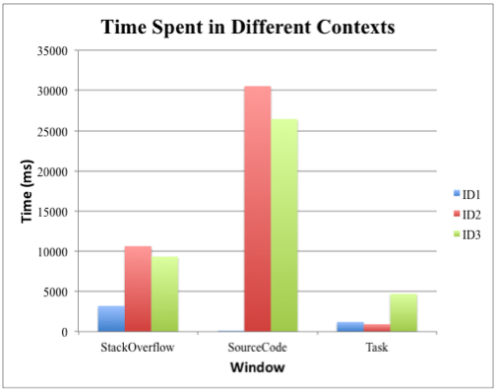

stackoverflow
Questions
Developer Jobs
Tags
Users
ValveBase
Search
ValveBase
search
40 results
relevance
newest
votes
active
0
votes
2
answers
Q: Extends ValveBase class : java.lang.ClassNotFoundException
I have created one web base application in java and i used the ValveBase class of java. The code is as below : public class RenewSessionValve extends ValveBase { private String ...
java
tomcat-valve
asked Jun 23 '14 by Keval Trivedi
0
votes
1
answer
Q: Finding the issue of java.lang.NoClassDefFoundError: org/apache/catalina/valves/ValveBase
I'm trying to use OpenID authorization code, but when it comes to WebAuthentication.login() The exception is thrown java.lang.NoClassDefFoundError: org/apache/catalina/valves/ValveBase at ...
exception
tomcat
catalina
asked Jul 25 '13 by user2620644

Correctness

Participant ID	Task A1	Task A2	Task E1	Task E2
Y1	Incorrect	Correct	Incorrect	Correct
Y2	Correct	Correct	Correct	Correct
Y3	Correct	Correct	Incorrect	Incorrect

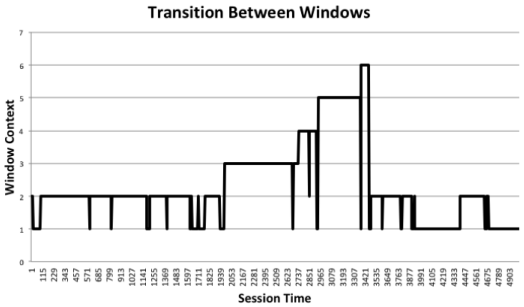
- Based off of documentation in both Eclipse and Android

Time Spent



- ID1
  - Only two correct
  - No source code used
- ID2
  - All correct
  - Most time spent in source code and Stack Overflow
- ID3
  - Two correct
  - Least familiar with Stack Overflow
  - Less confident compared to peers

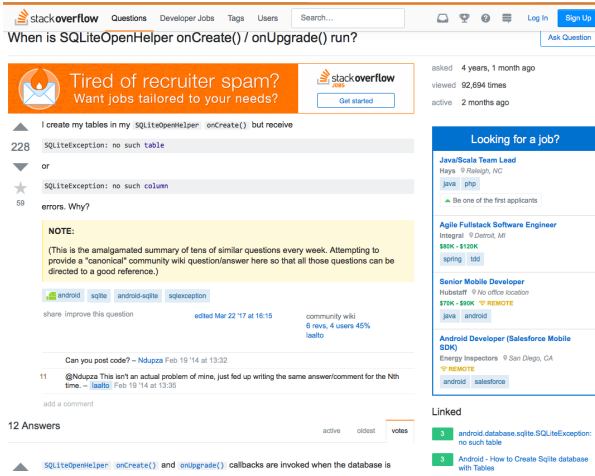
Navigation



- Different numbers are assigned to different platforms
  - 1 - Task File
  - 2 - Source Code
  - 3-6 - Various Stack Overflow pages
- Transition from page to page
- Transition from Stack Overflow to Task file to source code

Stack Overflow Gaze Information

- ID3
- Question text, question tag (briefly), question code
- Glanced at question answer



Future Work

- Collect more data
- Analyze and write results for publication
- Look at types of queries developers formulate

Conclusions

- More accuracy when both source code and Stack Overflow are used
- Code snippets are most beneficial
- Time spent reading source code and searching on Stack Overflow increases accuracy