Pictures at SERE 2014

Day 1 (June 30)
Contributions

- Improving scalability in integrated OS design
- Design and implementation of a new base of NetOS
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Bugs Found in PicFlick

- 993 of 12778 test cases resulted in application crashes on iOS, and 5 suspected bugs were found.

<table>
<thead>
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<th>Error Scenarios</th>
<th>Failure</th>
<th>Reasons of the failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>If the picture is too large, then the app of the picture will freeze.</td>
<td>121</td>
<td>Due to the limited resources for the smartphone application, the delay of its processing and transmission, the main reasons are the CPU and memory resources.</td>
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<td>2</td>
<td>If some actions of the app do not work smoothly, then the app will freeze.</td>
<td>103</td>
<td>The internal processing of the mobile app is very complex, causing the mainframes to freeze.</td>
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<tr>
<td>3</td>
<td>If the application was not properly designed, then the app will freeze.</td>
<td>84</td>
<td>The implementation of the design and operation of the application is not well designed.</td>
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<tr>
<td>4</td>
<td>If the application was not properly designed, then the app will freeze.</td>
<td>77</td>
<td>The implementation of the design and operation of the application is not well designed.</td>
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<tr>
<td>5</td>
<td>If the application was not properly designed, then the app will freeze.</td>
<td>74</td>
<td>The implementation of the design and operation of the application is not well designed.</td>
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</tbody>
</table>

- 925 of 12778 test cases resulted in application crashes on Android, but only bug 1 and bug 2 were reported.
FRAnC: A Ranking Framework for the Prioritization of Software Maintenance

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Example: bubble sorting

```c
#define MAXLEN 6
void bubble(int v[MAXLEN], int n)
{
    int i, j, k;
    if (n >= MAXLEN)
        return;
    for (i = n; i > 0; --i)
        for (j = 1; j < i; ++j)
            /* compare */
            if (v[j] > v[j + 1]){
                /* exchange */
                k = v[j];
                v[j] = v[j + 1];
                v[j + 1] = k;
            }
}
```

Test 1: (v=[4, 0, 1])
Path 1: (5F, 7F)

(a) Iteration
Confinement Label and Distribution

- Distribution rule

- Distribution of data (code) unit U and node N
- U can be distributed to N \( \rightarrow C(N) \supseteq C(U) \) and

- \( R(N) \subseteq R(U) \) and
- \( I(N) \subseteq I(U) \)
SaaS Example: Salesforce.com [3]

- Software within Software
- Same SaaS infrastructure for all tenant applications
- Separating metadata from data, and heavy indexing to improve performance.
- Runtime application generator dynamically builds applications in response to specific user requests
Experimentation

Case studies:
- Ecinema (simple web application) and Global Platform (industrial – 1500+ generated tests).

Research Questions:
- RQ1: How effective is SeTGaM?
- RQ2: How efficient is SeTGaM?
Thank you!