

End User Software Engineering

CHI'2007 Special Interest Group Meeting
Tue, May 2, 2007, 16:30-18:00, Room C4

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Definitions

- *(Note: may be controversial—defer discussion until later)*
- **Program**
 - “A set of statements that can be submitted as a unit to some computer system and used to direct the behavior of that system”
– *Oxford Dictionary of Computing*
- **Programming**
 - “The process of transforming a mental plan of desired actions for a computer into a representation that can be understood by the computer”
– *Jean-Michel Hoc and Anh Nguyen-Xuan*

Definitions, cont.

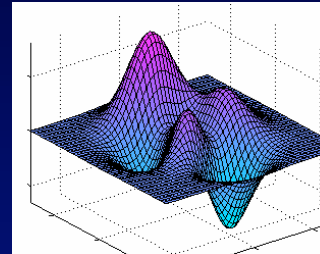
- **Professional Programmer**
 - Someone whose primary job function is to write or maintain software
 - Typically have significant training in programming (e.g., BS in CS)
- **Novice Programmer**
 - Someone who is learning to be a professional programmer

Definitions, cont.

- **End-User Programmer (EUP)**
 - People who write programs, but *not* as their primary job function
 - Instead, they must write programs in support of achieving their main goal, which is something else
 - Covers a wide range of programming expertise
 - Business executives and secretaries
 - Physicists

Examples of EUP

- Accounting (spreadsheets)
- Analysts using MatLab
- Creating a web page
- Recording Macros in Word
- Automating office tasks
- Business software (SAP programming)
- “Programming” VCRs, Microwaves
- Scientific research
- Authoring educational software
- Creating email filters
- Musicians configuring synthesizers
- Entertainment (e.g., behaviors in The Sims)
- Web 2.0: Mashups, end-user created content



```
Editor - D:\Work\matlab\toolbox\simbiotic_ned\diagrams\golfplot.m
23 - for n = 1:length(idList)
24 -     nameList(n) = num2str(p(n).id);
25 - end
26
27 spy(a)
28
29 %%%
30 % Remove singletons
31 [aSubs,nameListSubs] = blocksep(a,nameList,1);
32
33 %%%
34 clusterNum = 2;
35
36 aSub = aSubs(clusterNum);
37 nameListSub = nameListSubs(clusterNum);
38
39 if 0
40     aSub = a;
41     nameListSub = nameList;
42 end
43
44 %%%
45
46 score = zeros(size(nameListSub));
47 dateList = zeros(size(nameListSub));
48 1xList = zeros(size(nameListSub));
49
50 for i = 1:length(nameListSub)
51     id = eval(nameListSub(i));
52     1x = find(idList == id);
53     1xList(i) = 1x;
```

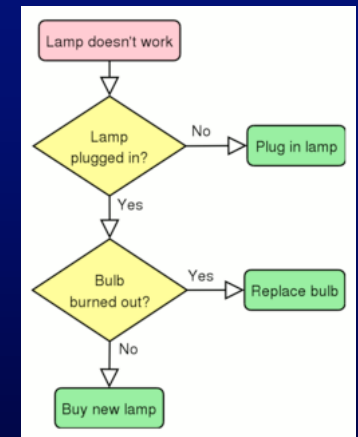


Other Names

- Also called “End User Development” (EUD)
 - As in European Commission’s

**NETWORK OF EXCELLENCE
ON END-USER DEVELOPMENT**

- Some “Domain-Specific Languages” (DSL)
 - Often created for end-user programmers
- Visual (Graphical) Programs
 - Sometimes created for EUP
- “Scripting” languages, “Macros”
- Rapid Application Development (RAD)

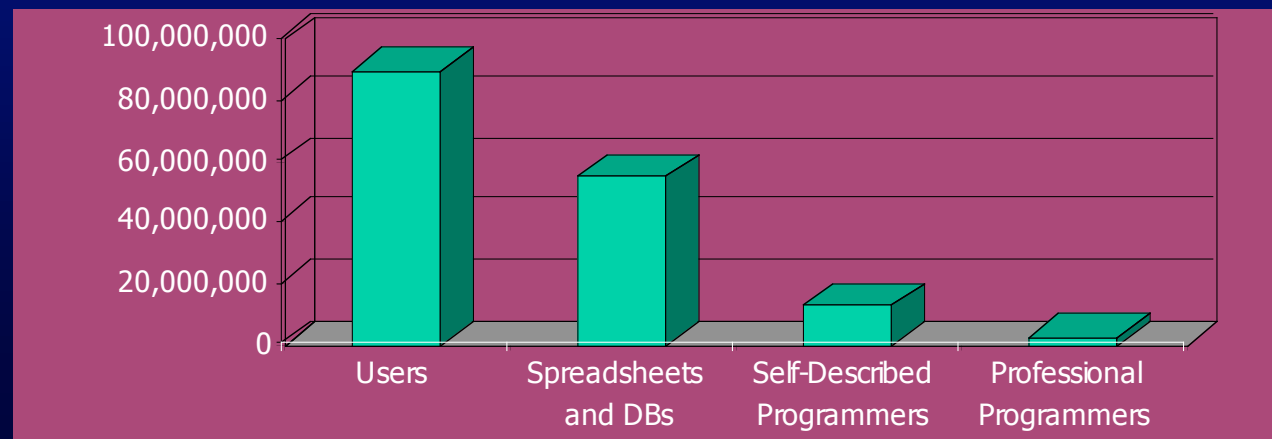


Definitions, cont.

- **End-User Software Engineering (EUSE)**
 - End-User Programming with the addition of systematic and disciplined activities that address quality issues
 - E.g., analyzing code, understanding unfamiliar code, testing code, checking code against a model, sharing code with coworkers, maintaining code, and deploying code, to name a few

End User Programmers

- A very large group
- In 2012: — *Scaffidi, Shaw and Myers 2005*
 - 90 million computer users at work in US
 - 55 million will use spreadsheets or databases at work (and therefore may potentially program)
 - 13 million will describe themselves as programmers
 - 3 million professional programmers
- We should make better tools for all of these people!



Evidence of Need for EUSE

- Why need Software Engineering for EUP?
- Lots of errors attributed to End-User Programming of spreadsheets:
 - Columbia Housing Authority admitted to overpaying by \$118,387 due to a spreadsheet data-entry error (February 22, 2006)
 - New York Times, Oct 30th, 2003 - \$1.2 Billion Spreadsheet Error at Fannie Mae
 - TransAlta Corp. took \$24 million charge to earnings due to cut-and-paste error in an Excel spreadsheet (June 3rd, 2003)
 - Auditor, major accounting firm:
“...in 6 years work, checking literally hundreds of business-critical models, ... my team have never failed to find errors.”
 - (many more!)
 - See <http://eusesconsortium.org/euperrors/>

Consequences, 2

- Also, errors in:
 - Web pages
 - Email filtering rules
- From the WEUSE II workshop at CHI'2006:
 - Clinical customization package used by medical personnel reports the need for better reuse and debugging support
 - SysAdmins need better testability of database and other sorts of scripts
 - Issues with reuse of MATLAB applications

So What is Happening?

- Growing group of researchers in EUSE

- One group: **The EUSES Consortium**



- End Users Shaping Effective Software

- 7 sites, 13 researchers + ~15 students from:



Oregon State



Penn State



Carnegie Mellon



Cambridge



Drexel



IBM



Nebraska

<http://eusesconsortium.org>

Addressing the Problem

- A multi-(sub)disciplinary problem needing:
 - Software engineering research
 - Programming language research
 - Education research
 - End-user programming research
 - HCI research of all types
- This is a big job, needs a whole community!
 - Hence, this SIG, to encourage interested people to work together with us and with each other
 - Also, connect researchers and EUP vendors



Many Sessions at CHI

- This kind of work is represented at many sessions at CHI:
- Mon, 14:30-16:00, Hartmann, et. al.
- Mon, 16:30-18:00, Liu and Li
- Mon, 16:30-18:00, Hurst, et. al.
- Tue, 11:30-13:00, Session: PROGRAMMING BY PROFESSIONALS
- Wed, 11:30-13:00, Little, et. al.
- Wed, 14:30-16:00, Ballagas, et. al.
- Wed, 14:30-16:00, Session: DEVELOPMENT PROCESS

Previous Meetings on This Topic

- Feb, 2007: Dagstuhl Conference on End-User Software Engineering
- CHI 2006: 2nd Workshop on End-User Software Engineering (WEUSE-II)
- ICSE 2005: 1st Workshop on End-User Software Engineering (WEUSE)
- CHI 2005 SIG on End Users Creating Effective Software
- CHI 2004 SIG on End Users Creating Effective Software
- Many proceedings and notes available off of EUSES web page: <http://eusesconsortium.org>

Ways to Get Involved

- Attend upcoming events.
- Get newsletter on end-user programming/software engineering:
 - (Low-volume). Sign-up sheet going around.
- Tell us today what you're working on.
- Help shape future events (starting with today's discussion).

Rest of This SIG

- Summary of the discussion at the Dagstuhl Conference on End-User Software Engineering
 - Margaret Burnett
- Summary of the draft of the survey paper on EUSE
 - Andrew Ko and Susan Wiedenbeck
- What everyone is working on that is relevant to EUP and EUSE
 - *YOU!*

Notes from CHI'2007 SIG

- ~50 participants: The following are notes from INDUSTRIAL participants:
- Cedric Houillet: AutoDesk – GIS product w/VB.Net
- Yaron Periglass: CADence – for hdw/eng
- Jeff Hoffman: Sun – tools for EUP,
 - study Fortran programmers, what HPC programmers do
 - Published in HPC forums
- Devon Welles: Intel – “channel platform group”
 - Integration and configuration
 - Adapting products for EUP
 - System integration
- Fred Jacobson, BMC Software – BMC Remedy Action Request System™, 4GL + VP, “no coding”, lots of screens, call it “application development”
 - Typical user would be IT person at large enterprise, or sys-admin
 - Programming or “hacking”, all levels of maturity
- Marat Boshernitsan: Agitar Software - build unit testing tools
- Sara Makarenko: AutoDesk – MapGuide, open source, GIS – difficult area for non-GIS experts to deal with data like this
- Robin Jeffries: Google –Search = EUP

More Notes

- **Gaby Wenneker – SAP Dev. Studio**
 - Moving more to a modelling env. for NP & P
- **Anson Tsao for Microsoft VS**
 - UI Shell for VS
- **Franz Schiele – SAP, business process modelling tools**
- **AutoDesk – Singapore, AutoCAD, vertical tools for process and power industries**
- **Dave Mellis: Arduino – electronics prototyping platform, for artist/designers, musical instruments**
 - Thurs, 2:30 talk
- **Amy Kidd: MathWorks, user community, manage usability group for MatLab**

Future Conferences

- PPIG'2007
- VL/HCC 2007
- IUI'2008
- CHI'2008