

Vorlesung

Software Engineering (SE)

Winter 2016/2017

Dr.-Ing. Clemens Reichmann

Clemens.Reichmann@vector.com,
Tel. 0721 91430-200

Institut für Technik der Informationsverarbeitung
Fakultät für Elektrotechnik & Informationstechnik
Karlsruher Institut für Technologie (KIT)



- Dozent

- Dr.-Ing. Clemens Reichmann

- Philipp-Reis-Str. 1, Karlsruhe
 - Telefon: 0721 / 91430-200
 - Mail: Clemens.Reichmann@vector.com
 - WWW: <http://www.vector.com>



- Betreuer

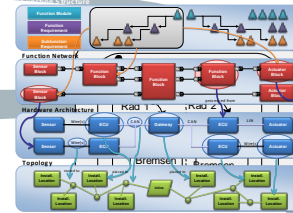
- Dipl.-Ing. Lukas Erlinghagen (ITIV)

- ITIV, Gebäude 30.10 / Engesserstraße 5, Raum 229
 - Telefon: 0721 / 608 - 46501
 - Mail: lukas.erlinghagen@kit.edu
 - WWW: <http://www.itiv.kit.edu>





Idee



Systementwurf
 Spezifikation - Modellierung - Simulation
 Requirements Engineering
 Echtzeitanforderungen

HW-Beschreibungssprachen

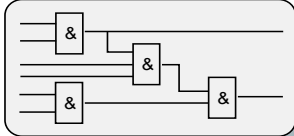
Digital (VHDL)
 Analog (VHDL-AMS, MAST)

```

PROCESS (schlupf, state)
BEGIN
CASE state IS
WHEN freilauf =>
IF schlupf > 0 THEN
next_state <=
bremset?
ELSE
    
```

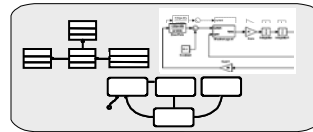
Entwurfsautomatisierung

Laufzeitmodellierung
 Syntheseverfahren



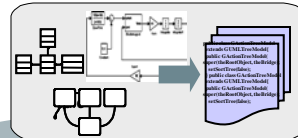
SW-Beschreibungssprachen

UML, Statecharts (Statemate),
 Blockdiagramme (Matlab SIMULINK)



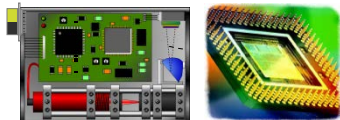
Code Generierung

Zielarchitekturen
 Codegeneratoren



Realisierung

Elektronische Systeme
 System on Chip (SoC)
 Mikrooptische Systeme
 Intelligente Sensoren
 Prototypenentwicklung



Technologietransfer

Telekommunikation – Medizintechnik
 Automatisierung – Automobilelektronik
 Kooperationsprojekte und Auftragsforschung
 Schulungen für Industriekunden



- Aktualisierung jeweils nach der Vorlesung
- Die Powerpointfolien stehen auf <https://ilias.studium.kit.edu/> als .pdf zum Download zur Verfügung:
https://ilias.studium.kit.edu/goto.php?target=crs_593532&client_id=produktiv




The image shows a thumbnail of a presentation slide. The slide has a white background with a blue border. At the top right, there are logos for 'itv' and 'KIT' (Karlsruher Institut für Technologie) with the text 'SE 15/16 Re-1' below them. The main title is 'Vorlesung Software Engineering (SE) Winter 2015/2016' in blue. Below the title, the presenter's name 'Dr.-Ing. Clemens Reichmann' is listed, along with his email 'Clemens.Reichmann@vector.com' and phone number 'Tel. 0721 91430-200'. A small portrait photo of Dr. Reichmann is on the right. At the bottom, the text 'Institut für Technik der Informationsverarbeitung Fakultät für Elektrotechnik & Informationstechnik Karlsruher Institut für Technologie (KIT)' is displayed, accompanied by 'itv' and 'KIT' logos.



PERSÖNLICHER SCHREIBTISCH MAGAZIN


Magazin [Organisationseinheiten](#) » [Fakultät für Elektrotechnik und Informationstechnik](#) » [WS 16/17](#)


 **WS 16/17**
Veranstaltungen des WS 16/17
Inhalt geändert


Aktionen ▾


Inhalt Info


KURSE

 **Advanced Radio Communications I**
The course gives a general overview of radio communication system. Further it covers and describes in detail comp
Veranstaltungsart: Vorlesung/Übung Dozent(en): Dr.-Ing. Marwan Younis ; M.Sc. Sören Maharens
Termin: two blocks between 14:00 and 17:15 Ort: Seminarraum -116 in Building 11.40
Start: 17. Okt 2016 Ende: 06. Feb 2017 Zyklus: wöchtl.
Abschluß: Master Anmeldezeitraum: Keine Anmeldung möglich

 **Angewandte Informationstheorie (WS16/17)**
Inhalt geändert

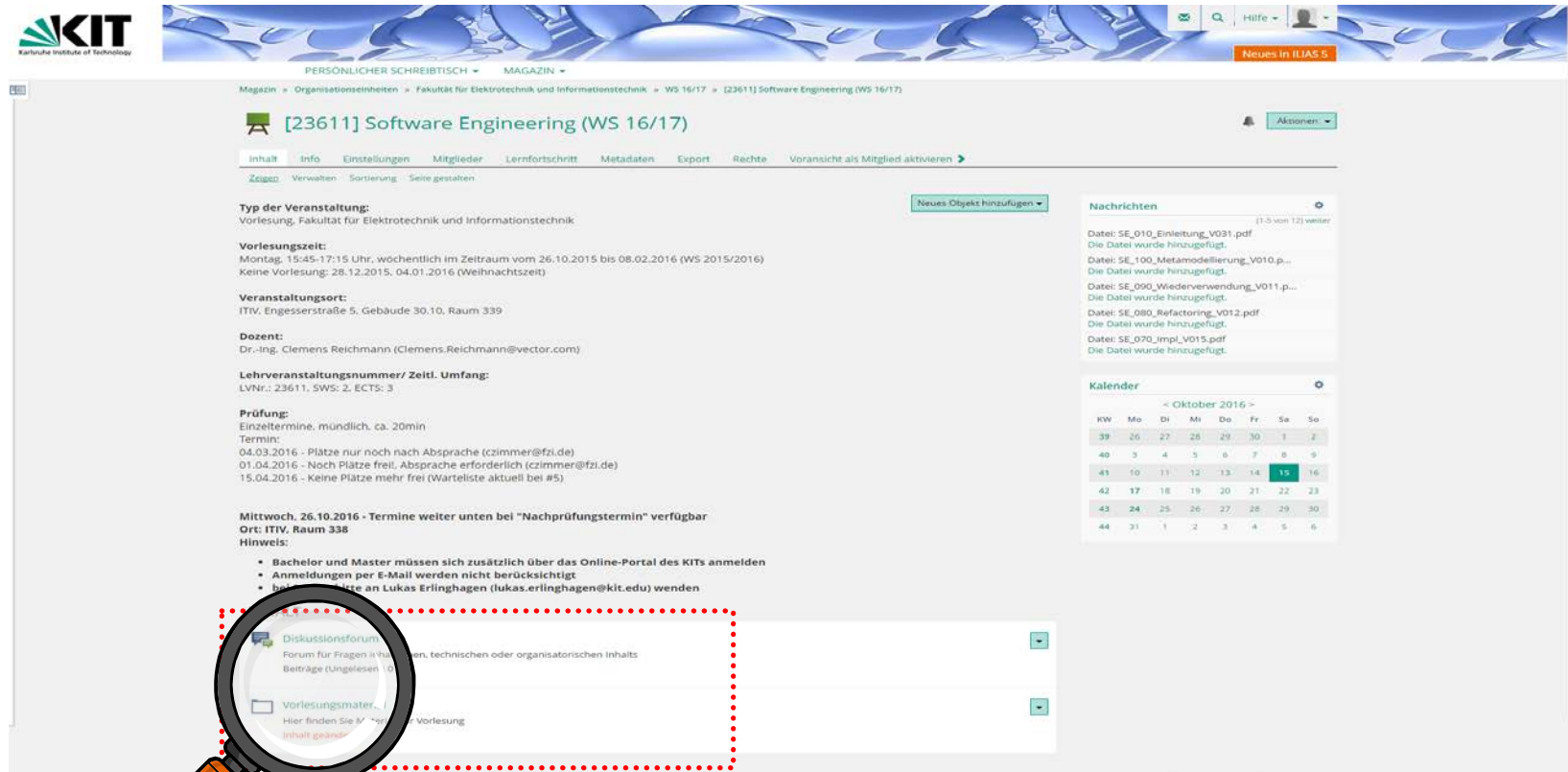
 **[23611] Software Engineering (WS 16/17)**
Veranstaltungsart: Seminar Dozent(en): Dr.-Ing. Clemens Reichmann
Termin: 15:45-17:15 Ort: Gebäude 20.30, SR 1.067
Start: 17. Okt 2016 Ende: 06. Feb 2017 Zyklus: wöchtl.
Abschluß: Bachelor & Master

 **Eingebettete Schaltkreise und Detektoren**
Inhalt geändert
Anmeldezeitraum: Keine Anmeldung möglich

 **Energy Storage and Network Integration - WiSe 16/17**
Anmeldungsende: 05. Feb 2017, 00:00

 **Grundlagen der Hochfrequenztechnik (WS16/17)**

Passwort:
softw@re



[23611] Software Engineering (WS 16/17)

Typ der Veranstaltung: Vorlesung, Fakultät für Elektrotechnik und Informationstechnik

Vorlesungszeit: Montag, 15:45-17:15 Uhr, wöchentlich im Zeitraum vom 26.10.2015 bis 08.02.2016 (WS 2015/2016)
Keine Vorlesung: 28.12.2015, 04.01.2016 (Weihnachtszeit)

Veranstaltungsort: ITV, Engesserstraße 5, Gebäude 30.10, Raum 339

Dozent: Dr.-Ing. Clemens Reichmann (Clemens.Reichmann@vector.com)

Lehrveranstaltungsnummer/ Zeitl. Umfang: LVNr.: 23611, SWS: 2, ECTS: 3

Prüfung: Einzeltermine, mündlich, ca. 20min
Termin: 04.03.2016 - Plätze nur noch nach Absprache (czimmer@fzi.de)
01.04.2016 - Noch Plätze frei, Absprache erforderlich (czimmer@fzi.de)
15.04.2016 - Keine Plätze mehr frei (Warteliste aktuell bei #5)

Mittwoch, 26.10.2016 - Termine weiter unten bei "Nachprüfungstermin" verfügbar
Ort: ITV, Raum 338

Hinweis:

- Bachelor und Master müssen sich zusätzlich über das Online-Portal des KITs anmelden
- Anmeldungen per E-Mail werden nicht berücksichtigt
- bei weiteren Fragen an Lukas Erlinghagen (lukas.erlinghagen@kit.edu) wenden

Diskussionsforum
Forum für Fragen in inhaltlichen, technischen oder organisatorischen Inhalts
Beiträge (Ungelesen): 0

Vorlesungsmaterial
Hier finden Sie Material zur Vorlesung
Inhalt geändert

INHALT

-  **Diskussionsforum**
Forum für Fragen inhaltlichen, technischen oder organisatorischen Inhalts
Beiträge (Ungelesen): 0 (0)
-  **Vorlesungsmaterial**
Hier finden Sie Material zur Vorlesung
Inhalt geändert

Vorlesung	Termin: Montag, 15:45-17:15 Uhr
1	17.10.2016
2	24.10.2016
3	31.10.2016 (entfällt)
4	07.11.2016
5	14.11.2016
6	21.11.2016
7	28.11.2016
8	05.12.2016
9	12.12.2016
10	19.12.2016
11	09.01.2017
12	16.01.2017
13	23.01.2017
14	30.01.2017
15	06.02.2017

- Mündlich, ca. 20 min
- Termine:
 - Freitag, 17.02.2017
 - Freitag, 24.02.2017
 - Weitere nach Bedarf
- Ort: ITIV, Raum 338
- Anmeldung:
Terminpool in ILIAS-Veranstaltung
- **Online-Prüfungsanmeldung notwendig!**
(<https://studium.kit.edu/>)
- Zur Prüfung mitbringen:
 - Studentenausweis



- Es ist eine Online-Prüfungsanmeldung <https://studium.kit.edu/> notwendig!

Sie sind nicht angemeldet. | ANMELDEN

HOME | KONTAKT | IMPRESSUM/DISCLAIMER | KIT



Studierendenportal

**Karlsruher Institut
für Technologie**
KIT – Universität des
Landes Baden-Württemberg
und nationales
Forschungszentrum
in der
Helmholtz-Gemeinschaft

Sie waren längere Zeit nicht aktiv. Daher wurde Ihre Anmeldung am Portal aus Sicherheitsgründen beendet.

Studierende melden sich mit ihrem Stud-Account (z.B. uXXXX) und ihrem Passwort an.

Dozenten melden sich bitte mit ihrem KIT-Account oder ihrer KIT-E-Mailadresse (vorname.nachname@kit.edu) als Benutzerkennung und ihrem Passwort an.

Benutzerkennung:

Passwort:

Anmelden

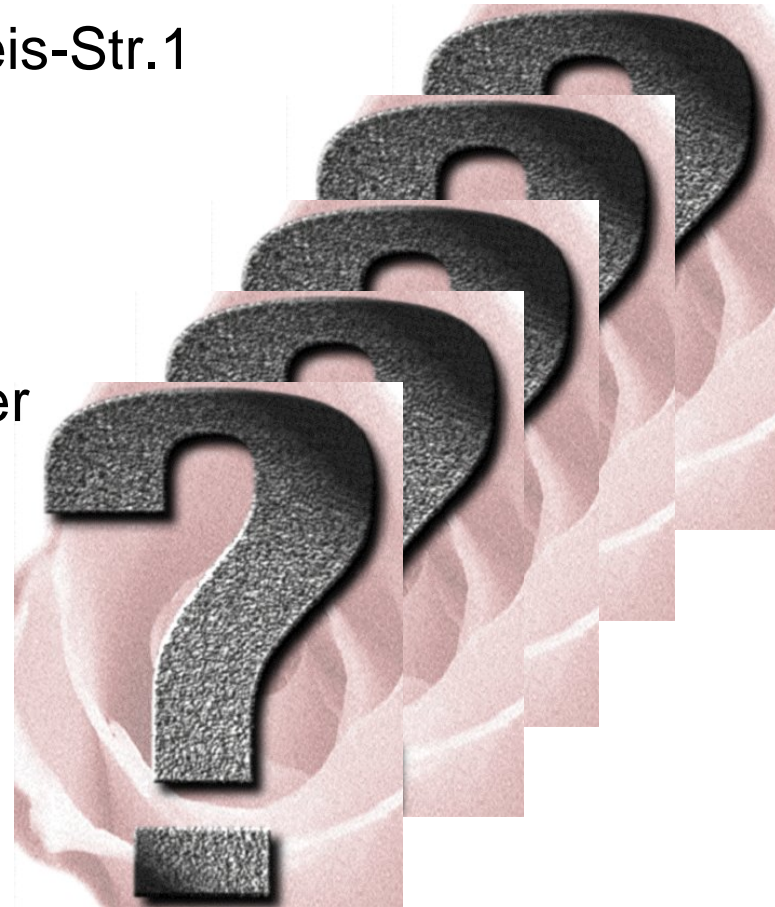
Kontakt bei Fragen

Bei Fragen zum Studium wenden Sie sich bitte an das [Studienbüro](#).
Der Service Desk des SCC, [BIT8000](#) (Tel. 0721/608-8000), steht Ihnen für die Beantwortung Ihrer Fragen bezüglich des Zugangs zum Studierendenportal gerne zur Verfügung.

- Fragestunde

- Fragen vorab per E-Mail an Clemens.Reichmann@vector.com
- **Di. 07.02.2017**
- Vector-Informatik, Philipp-Reis-Str.1
- 14:00-15:30 Uhr

→ Haben Sie Interesse an einer solchen Veranstaltung?



1. Zielsetzung der Vorlesung
2. Begriffe des Software Engineering
 - Grundlagen wie Begriffe, Prozesse, Vorgehensmodell, Methode, ...
3. Anforderungsmanagement
 - Anforderungen erfassen und managen
 - Werkzeuge/Methodik: SysML, Elektrik/Elektronik-Architektur
4. Projektmanagement
 - wie wird ein Projekt organisiert, überwacht, ...
5. Softwareentwurf
 - modularer Entwurf, objektorientierter Entwurf, UML2
6. Entwurfsmuster
 - typische Lösungen

7. Implementierung und Werkzeuge

→ rund um die Programmierung

8. Refactoring

→ Qualität beim Programmieren/Modellieren

9. Softwarewiederverwendung

→ wieder verwenden von SW (aus Bibliothek, Framework, Altbestand, ...)

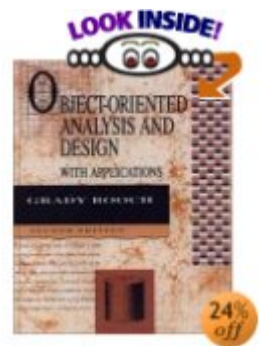
- Software Engineering, Ian **Sommerville**, 9. Auflage, Addison-Wesley, 2012



- **Balzert**, Helmut: Lehrbuch der Softwaretechnik (Teil 1: Software-Entwicklung; Teil 2: Software-Management, Qualitätssicherung, Unternehmensmodellierung). 2. Auflage, Spektrum Akademischer Verlag, Feb. 2008.



- Wirfs-Brock; Wiklerson; Wiener: Designing Object-Oriented Software. Prent. Hall, 1990.
- Booch: Object-Oriented Analysis and Design with Applications . Addison-Wesley Professional. 1993.
- Ivar Jacobson et. al.: Das UML-Benutzerhandbuch, ISBN: 3827314860, Addison-Wesley



- Erfolgreich im Team, Christoph V. Hang, dtv Verlag, 1998
- Projekte zum Erfolg führen, Heinz Schelle, dtv Verlag, 1999
- The Push to Make Software Engineering Respectable. Describes the essentials of professionalism for software engineers. (G. Pour, M. L. Griss and M. Lutz, *IEEE Computer*, 33 (5), May 2000) Special Issue on Software Process Diversity. This special issue includes a number of interesting and useful articles on different types of process for developing software. It also includes articles covering process maturity and the CMM model (Chapter 25). (*IEEE Software*, 17 (4), July 2000)
- Extreme programming - Development through Dialog. A short introduction that addresses common concerns about extreme programming. (R. C. Martin, *IEEE Software*, July 2000)
- A Software Development Process for Small Projects. Suggests a software process that has been adapted for small companies. (M. L. Russ and J. D. McGregor, *IEEE Software*, 17 (4), September 2000)
- Wisdom: A Software Engineering Method for Small Software Development Companies. A discussion of a 'lightweight' method that brings some elements of systematic software engineering to small organisations who cannot afford complex methods. (N. J. Nunes and J. F. Cunha, *IEEE Software*, 17 (4), September 2000)

- Weaving Together Requirements and Architectures. A short discussion of how requirements engineering and architectural design can be integrated in an evolutionary development process. (B. Nuseibeh, *IEEE Computer*, March 2001)
- Get Ready for Agile Methods, with Care. A good discussion of the pros and cons of agile methods such as extreme programming by a leading software engineering practitioner and researcher. (B. Boehm, *IEEE Computer*, 35 (4), January 2002)
- Software System Engineering: A Tutorial. There are few articles published on this important topic. This is a good overview and introduction. (R. H. Thayer, *IEEE Computer*, 35 (4), April 2002)
- The Agile Methods Fray. A follow-up to Boehm's January article presented as a discussion between Boehm and DeMarco. (T. DeMarco and B. Boehm, *IEEE Computer*, 35 (6), June 2002)

- A Reference Model for Requirements and Specifications (C. A. Gunter, E. L. Gunter, M. Jackson and P. Zave, *IEEE Software*, 17 (2), March 2000)
Requirements Management: The search for Nirvana (D. J. Reifer, *IEEE Software*, 17 (3), May 2000)
- Requirements that Handle IKIWISI, COTS and Rapid Change. An interesting short article on how requirements engineering has to evolve to cope with different types of software development. (B. Boehm, *IEEE Computer*, 33 (7), July 2000)
- Developing Groupware for Requirements Negotiation: Lessons Learned. A description of a support systems based around Boehm's win-win approach for teams who are negotiating system requirements (B. Boehm, P. Grunbacher, R. O. Briggs, *IEEE Software*, 18 (3), May/June 2001)
- Where do Requirements Come From. A short description of a new approach to requirements discovery using stimuli to creative thinking. (N. Maiden and A. Gizikis, *IEEE Software*, 18 (5), September/October 2001)
- Correctness by Construction: Developing a Commercial Secure System. Discusses the use of formal specification in developing a secure system (A. Hall and R. Chapman, *IEEE Software*, 19 (1), January/February 2002)

- What do you mean by COTS. The use of COTS systems, discussed in Chapter 14, is likely to be increasingly important. This is an interesting clarification of the sometimes-confusing terminology in this area. (D. Carney and F. Long, *IEEE Software*, 17 (2), March 2000) Redesigning Air Traffic Control: An exercise in software design (D. Jackson and J. Chapin, *IEEE Software*, 17 (3), May 2000)
- Real-time Distributed Object Computing: An Emerging Field. A special section discussing the use of distributed objects in real-time systems (E. Shokri and P. Sheu, *IEEE Computer*, 33 (6), June 2000)
- Diversity in Reuse Processes. Describes four different successful approaches to achieve software reuse. (M. Morisio, C. Tully and M. Ezran, *IEEE Software*, 17 (4), July 2000)
- Component-based Enterprise Frameworks. A special issue of the CACM with a range of papers on frameworks. (*Comm ACM*, 43 (10), October 2000)
- Tracking Usability Issues: To Bug or Not to Bug. A discussion of how usability problems that arise in a system can be tracked and integrated with other problem reporting systems. There are conflicting viewpoints on whether these issues should be classed as system bugs (C. Wilson and K. Coyne, *ACM Interactions*, May/June 2001, 8 (3))
- Accelerating Development with Agent Components. One of a number of articles on very rapid software development (software engineering on internet time) which proposes the use of agents for more rapid delivery. The problems of verification and validation of agent-based systems are not covered (and these are big problems). (M. Griss and G. Pour, *IEEE Computer*, May 2001, 34 (5))

- COTS-based Systems Top 10 List. A list of hypotheses about COTS-based systems which highlights why this approach may not be as cheap nor as effective as enthusiasts suggest (V. R. Basili and B. Boehm. *IEEE Computer*, 34 (5), May 2001)
- Middleware Challenges Ahead. A good summary of the features that next-generation middleware will have to provide to support new types of distributed application such as ubiquitous computer systems. (K. Geihs, *IEEE Computer*, June 2001, 34 (6))
- Comm. ACM. Special Issue on Aspect-oriented Programming. This special issue includes an introduction to aspect-oriented programming - an approach to program design that may have a major impact on future software development (*Comm. ACM*, 44 (10), October 2001)
- Will UML 2.0 be agile or awkward. A plea for the revision of UML expected in 2002 to be lean rather than flabby. (*Comm. ACM*, 45 (1), January 2002)
- The Case for Reflective Middleware. Discusses a new approaches to the construction of middleware for distributed systems. (F. Kon, F. Costa, G. Blair and R. H. Campbell. *Comm. ACM*, 45 (6), June 2002)

- Can you Trust Software Capability Evaluations. Discusses practical problems with using the CMM model to assess contractor capability. (E. O'Connell and H. Saiedian, *IEEE Computer*, 33 (2), February 2000) Applying CMM Project Planning practices to Diverse Environments. Discusses how the Capability Maturity Model can be adapted to cope with development environments that are different from the large, long-lifetime project developments for which the model was designed. (D. L. Johnson and J. G. Brodman, *IEEE Software*, 17 (4), July 2000)
- How Internet Companies Negotiate Software Quality. An article discussing the difficulties of applying conventional approaches to software quality management when there are very severe schedule pressures and a need for rapid delivery. (R. Baskerville et al., *IEEE Computer*, May 2001, 34 (5))
- There have been major revisions of capability maturity models discussed in Chapter 25 with a new integrated model suite published by the Software Engineering Institute. Full information can be accessed at <http://www.sei.cmu.edu/cmml/> but I hope to find something more accessible soon.
- Extreme Collaboration. Discusses an approach used at NASA's Jet Propulsion Laboratory for rapid aerospace design. This involves a design team working together in a large room with lots of public displays. (G. Mark. *Comm. ACM*, 45 (6), June 2002)

