

CSI 2911 W2011
Professional Practice in Computer Science
Winter 2012

Liability for Software Development

Guest Lecture, March 14, 2012



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INTRODUCTION

SCOPE

- FOCUS: Obligations to avoid faulty software
- NOT COVERED: Liability that may arise from software purposefully designed in violation of a law

Drivers of Liability

- Typically harm-driven
- Software is increasingly critical to important activities
 - ❖ Increasing capacity to cause 'harm' through software

Two ways software is becoming critical:

- Increasingly necessary for properly functioning hardware
- Critical day to day tasks increasingly mediated by software

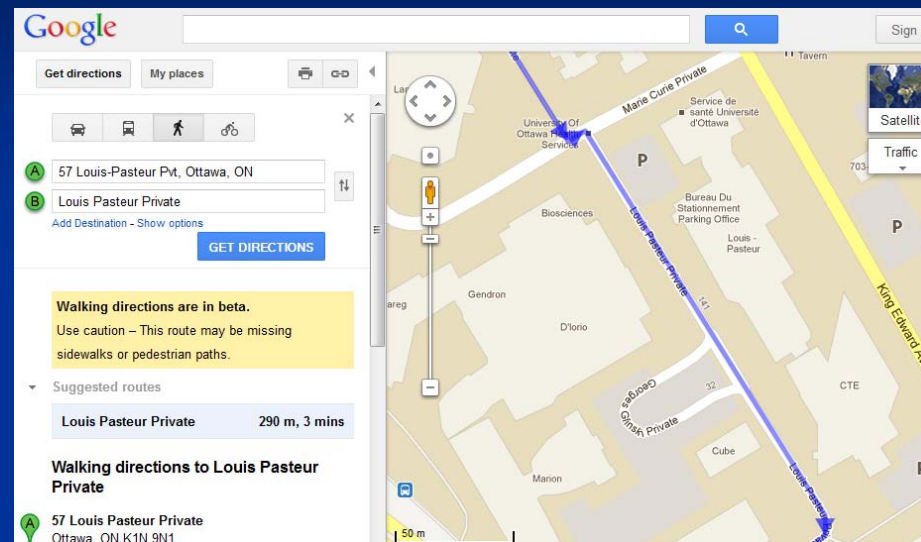
DRIVERS OF LIABILITY

'AUTOMATED' SERVICES

Google Maps, 2012, <maps.google.ca>

DIRECTIONS:

- People rely on GPS and mapping combinations in place of maps
- Obligation to provide accurate information?



24. Defendant Google, through its "Google Maps" service provided Plaintiff Lauren Rosenberg with walking directions that led her out onto Deer Valley Drive, a.k.a. State Route 224, a rural highway with no sidewalks, and a roadway that exhibits motor vehicles traveling at high speeds, that is not reasonably safe for pedestrians.
25. The Defendant Google expects users of the walking map site to rely on the accuracy of the walking directions given.

Rosenberg v. Harwood, (2010), Case No. 2:10-cv-496, Utah Dist Ct, Central Div
Plaintiff's statement of claim, <<http://www.scribd.com/doc/32136379/Rosenberg-v-Harwood-Google>>

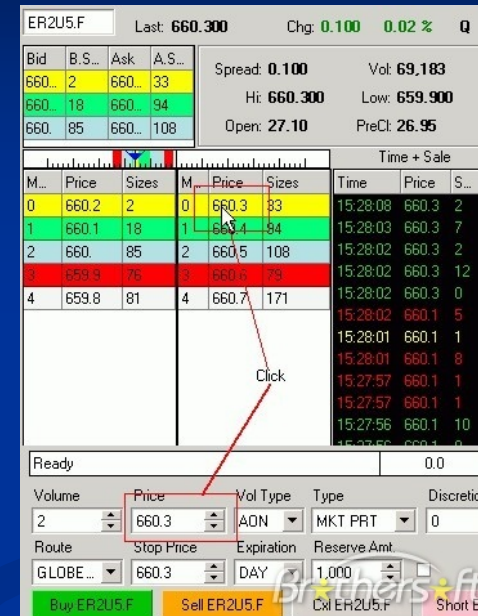
DRIVERS OF LIABILITY

'AUTOMATED' SERVICES

Financial Trading:

- People rely on online software to accurately reflect high-paced trading decisions;
- Traders expect software to respond at 'market speed'
- Mistakes can lead to high-stakes financial losses

'NetTrader 1.0'



Zhu v. Merrill Lynch HSBC, [2002] B.C.J. No. 2883

SOURCE: Brothersoft.com, <<http://www.brothersoft.com/nettrader-172170.html>>

“Why indeed should someone who is using the NetTrader services offered by the Defendant as permitting the customer to make trades on his or her personal computer, have to telephone the Defendant to confirm that a trade has taken place or for that matter, cancelled? One might properly ask why would one retain the Defendant's services for net trading if before he or she can proceed confirmation of the trade has to be obtained by telephone...It strikes me that the nature of the Defendant's services demands a higher duty of care and performance than ordinarily expected in the provision of services, because of the high risk of loss of a customer's investment monies.”

DRIVERS OF LIABILITY

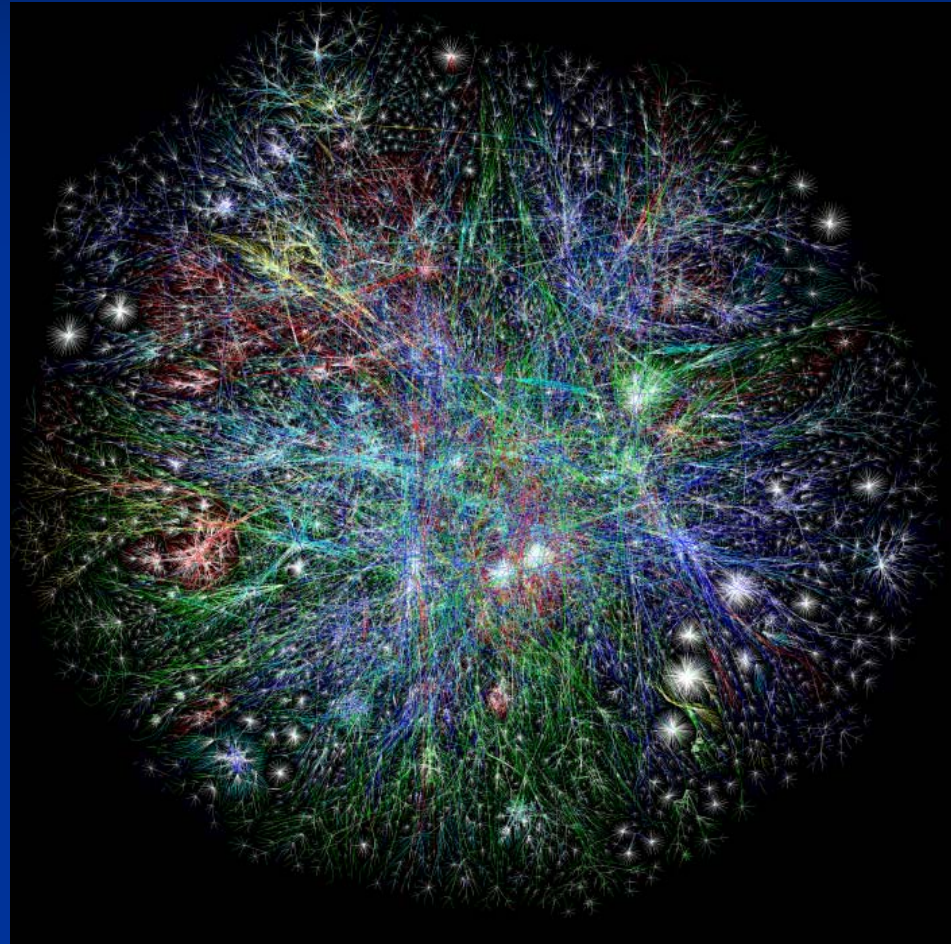
HARDWIRED SOFTWARE

CRITICAL INFRASTRUCTURE:

- Critical infrastructure is increasingly reliant on software:
 - **Internet**
 - Communications
 - Smart Grid

Government Services migrate online:

- Taxes
- Health records/services
- Voting
 - Increases the relevancy of ensuring secure, functioning connectivity



Graphic: The Opte Project, CC-BY-NC-SA 1.0, 2003 <<http://www.opte.org/maps/>>

DRIVERS OF LIABILITY

HARDWIRED SOFTWARE

CRITICAL INFRASTRUCTURE:

- Critical infrastructure is increasingly reliant on software:
 - Internet
 - **Communications**
 - Smart Grid
- 911 calls do not work w/out location;
- VoIP does not have the software/hardware capacity to make 911 calls affectively;

SOURCE: G. Mills, "In the case of an emergency – there's no need to panic when dialing 911", BizVoIP.com, February 21, 2012, <<http://www.bizvoip.com/blog/2012/02/in-the-case-of-an-emergency-theres-no-need-to-panic-when-dialing-911/>>



“Since the inception of 9-1-1 service, three decades ago, the Canadian public has been educated to dial 9-1-1 in case of an emergency. As such, there is a general public expectation that where 9-1-1 service is available, an individual can dial 9-1-1 for access to trained emergency call agents who can provide the necessary information and assistance. The Commission considers that these expectations exist regardless of the type of technology (i.e., wireline or wireless) that callers use to dial 9-1-1.”

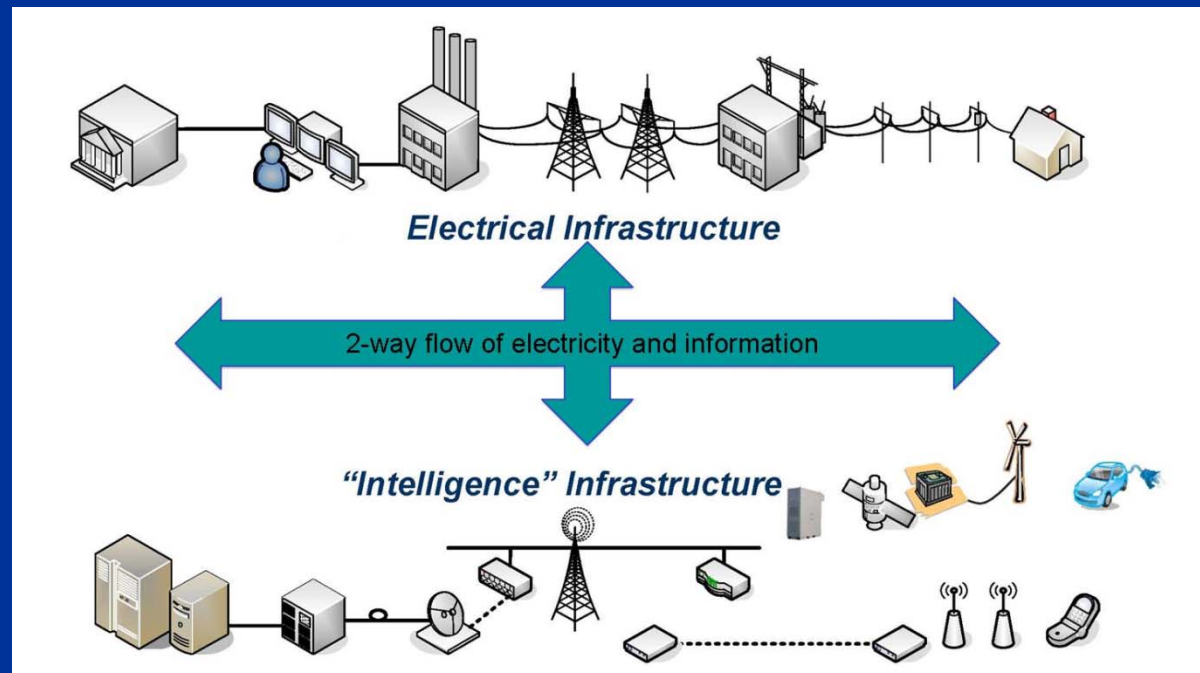
DRIVERS OF LIABILITY

HARDWIRED SOFTWARE

CRITICAL INFRASTRUCTURE:

- Critical infrastructure is increasingly reliant on software:
 - Internet
 - Communications
 - **Smart Grid**

SOURCE: NIST, "Smart Grid", Information Technology Laboratory, March 16, 2011, <<http://www.nist.gov/itl/antd/emntg/smartgrid.cfm>>



DRIVERS OF LIABILITY

HARDWIRED SOFTWARE

Terabithia4 CC-BY-NC-SA 2.0, 2009,
<http://www.flickr.com/photos/terabithia4/3285167273/>

AUTOMOBILES

- Perhaps most frequent source of negligence suits
- Computers now implemented in engines



In Re: Toyota Corp. Hybrid Brake Marketing, Sales, Practices and Product Liability Litigation, Case No.: SAML 10-02172-CJC(RNBx), (U.S., C.D. Cal., 2011)

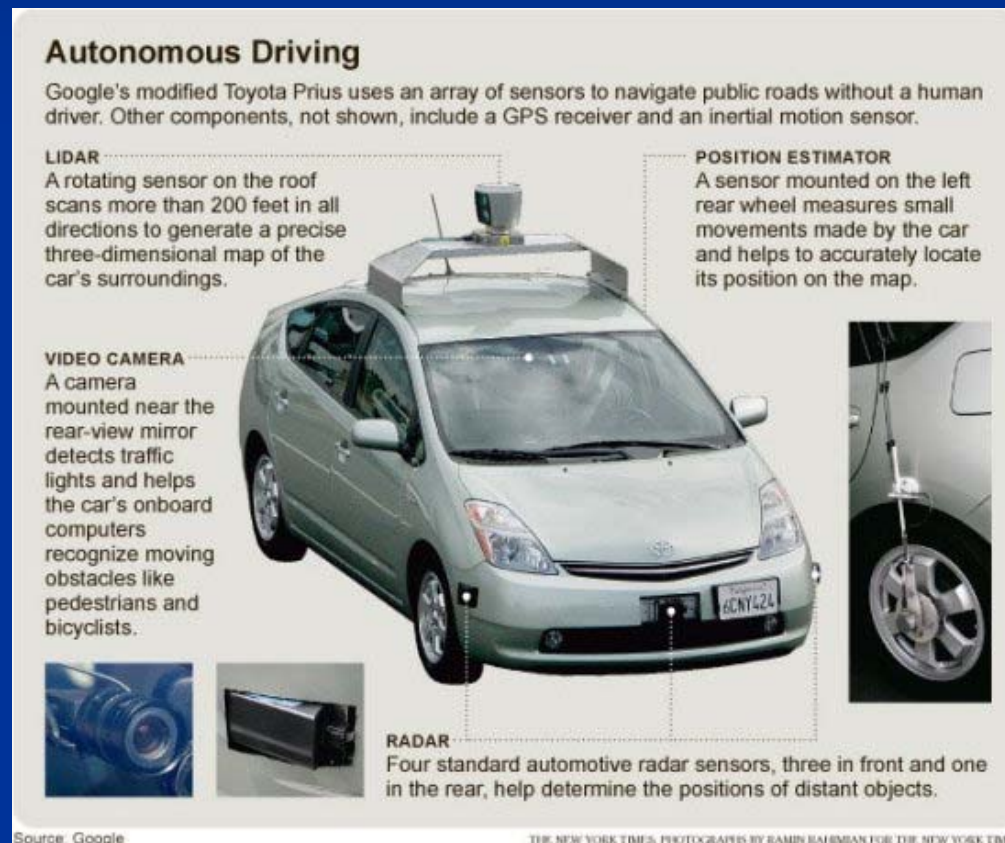
“Plaintiffs allege that a defect in the anti-lock brake system (the “ABS”) of the Class Vehicles caused the ABS to improperly engage when it is not needed, resulting in increased stopping time and distance. Plaintiffs further allege that Toyota had notice of the defect as early as July 2009 but nevertheless failed to disclose the defect on a timely basis, continued to manufacture and sell the Class Vehicles, and advertised the Class Vehicles as safe and reliable. In February 2010, Toyota voluntarily recalled the Class Vehicles and offered to install a software update to remedy the braking defect. Despite the recall, Plaintiffs claim that the braking defect has not been cured, and they have suffered ensuing monetary and property damages.”

DRIVERS OF LIABILITY

HARDWIRED SOFTWARE

AUTOMOBILES (Part 2)

- Perhaps most frequent source of negligence suits
- Computers now implemented in engines



SOURCE: Google. Photographs by Ramin Rahimian for the New York Times. October 10, 2010, <http://www.nytimes.com/imagepages/2010/10/10/science/10googleGrfxA.html?ref=science>

TYPES OF LIABILITY

Legal Obligations may be

- *Contractual – Arising from software development contracts*
- *Professional – Arising from role as an ‘engineer’*
- *Tortious – Arising from general duties we owe each other*
- *Governance/Regulation – Arising from targeted laws*

CONTRACTUAL OBLIGATIONS

CONTRACTS – BRIEF OVERVIEW

Contract law protects obligations undertaken between individuals.

- If you promise X to develop a software suite in a contract and fundamentally fail to do so, you may be obligated to compensate X for any damage you caused her
- “Reasonable Fitness for Purpose”
 - By signing a contract to provide a product such as a car, it is often implied as a condition of that contract that the product should, at minimum, do what it is intended to do.
 - A failure to provide breaks that work properly on Toyota hybrid cars likely *“manifest a defect that is so basic it renders the vehicle unfit for its ordinary purpose of providing transportation.”*

In Re: Toyota Corp. Hybrid Brake Marketing, Sales, Practices and Product Liability Litigation, Case No.: SAML 10-02172-CJC(RNBx), (U.S., C.D. Cal., 2011)

REMEDY

- May be obligated to provide the promised product in working condition;
- May be liable for any foreseeable damage resulting from the defect (car accidents)

PROFESSIONAL OBLIGATIONS

SOURCES OF PROFESSIONAL OBLIGATIONS

SOURCES OF PROFESSIONAL OBLIGATIONS

- Attain an accredited software engineering degree (P. Eng)
- Become a member of a professional engineering organization [Professional Engineers Ontario - PEO]
- Defined and overseen by a self-regulatory body [PEO] authorized by law [*Professional Engineers Act*]

R.S.O. 1990, c. P.28, <http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90p28_e.htm>

- Obligations are enforced by tribunals composed of fellow professionals +others [PEO Disciplinary Committee]

PROFESSIONAL OBLIGATIONS

PROFESSIONAL OBLIGATIONS

“A professional engineer is a person holding a professional engineering licence granted by a provincial engineering licensing body such as PEO. Holders of a valid licence are allowed to use the title “P.Eng.””

PEO, “Licensing as a Professional Engineer”,
<<http://www.peo.on.ca/registration/SoftwarePamphlet.pdf>>



Mobilefolk, public domain, 2009,
<<http://commons.wikimedia.org/wiki/File:Ironring2005.JPG>>



A.A. Chesterfield/Library and Archives Canada, 1916 (Public Domain),
<http://commons.wikimedia.org/wiki/File:Collapse_of_the_centre_span_of_the_Quebec_Bridge.jpg>

PROFESSIONAL OBLIGATIONS

NATURE OF OBLIGATIONS

PEO Code of Ethics, Preamble, <<http://www.peo.on.ca/>>

“Section 77 of Regulation 941 states that ‘it is the duty of a practitioner to the public, to the practitioner's employer, to the practitioner's clients, to other licensed engineers of the practitioner's profession, and to the practitioner to act at all times with:

- i. fairness and loyalty to the practitioner's associates, employers, clients, subordinates and employees,*
- ii. fidelity to public needs,*
- iii. devotion to high ideals of personal honour and professional integrity,*
- iv. knowledge of developments in the area of professional engineering relevant to any services that are undertaken, and*
- v. competence in the performance of any professional engineering services that are undertaken.’*

Through the Code of Ethics, professional engineers have a clearly defined duty to society, which is to regard the duty to public welfare as paramount, above their duties to clients or employers.”

- ❖ Purpose: provide personal accreditation, instil confidence in engineering and ensure public welfare by enforcing standards in ways that non-technical customers cannot
- ❖ Engineers may lose their license to practice if they fail to perform competently
- ❖ In becoming an engineer, you take on ethical obligations to consider more than your employer's interests.

PROFESSIONAL OBLIGATIONS

'SOFTWARE' ENGINEERS

Are software engineers 'Engineers'?

12. (1) No person shall **engage** in the practice of professional engineering or hold himself, herself or itself out as engaging in the practice of professional engineering unless the person is the holder of a licence, a temporary licence, a provisional licence or a limited licence.

*“practice of professional engineering” means **any act** of planning, designing, composing, evaluating, advising, reporting, directing or supervising **that requires the application of engineering principles and concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment, or the managing of any such act;** (“exercice de la profession d’ingénieur”)*

Professional Engineers Act, R.S.O. 1990, c. P.28,
<http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90p28_e.htm>

PROFESSIONAL OBLIGATIONS

'SOFTWARE' ENGINEERS

Does software engineering “require[] the application of engineering principles and concern[] the safeguarding of life, health, property, economic interests, the public welfare or the environment”?

“PEO’s mandate is to ensure that the public welfare and interest are served where engineering is concerned. Since the practice of software engineering has the potential of impacting the public interest, PEO is responsible for its regulation. This view is consistent with the IEEE definition of software engineering as: the application of a systematic, disciplined, quantifiable approach to the development, operation and maintenance of software: that is the application of engineering to software.”

Recommendations of the Software Engineering Task Force, Nov 16, 2000,
<http://www.peo.on.ca/News/Software_ccpesubmission.htm>

'Safeguarding life, health, property?'

- Residential/business software packages
- Stock exchange/Financial software
- Nuclear power plants
- Automobiles
- Internet/Critical Information Systems

PROFESSIONAL OBLIGATIONS

PEO DISCIPLINARY MEASURES

The PEO Disciplinary Committee may find any 'engineer' guilty of either **professional misconduct** or **incompetence**.

POSSIBLE PENALTIES:

- Revocation of license (temporary or permanent)
- Impose fines up to \$5,000
- Place various conditions on the engineer's continued practice

INCOMPETENCE

- (a) ...displayed in his or her professional responsibilities a lack of knowledge, skill or judgment or disregard for the welfare of the public of a nature or to an extent that demonstrates the member or holder is unfit to carry out the responsibilities of a professional engineer; or*
- (b) ...is suffering from a physical or mental condition or disorder of a nature and extent making it desirable in the interests of the public or the member or holder that the member or holder no longer be permitted to engage in the practice of professional engineering or that his or her practice of professional engineering be restricted.*

Professional Engineer's Act, Ontario

PROFESSIONAL OBLIGATIONS

PEO DISCIPLINARY MEASURES

PROFESSIONAL MISCONDUCT

(a) negligence,

(b) failure to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work for which the practitioner is responsible,

(c) failure to act to correct or report a situation that the practitioner believes may endanger the safety or the welfare of the public,

(f) failure of a practitioner to present clearly to the practitioner's employer the consequences to be expected from a deviation proposed in work, if the professional engineering judgment of the practitioner is overruled by non-technical authority in cases where the practitioner is responsible for the technical adequacy of professional engineering work,

(h) undertaking work the practitioner is not competent to perform by virtue of the practitioner's training and experience

Professional Engineer's Act, R.R.O. 1990, Regulation 941, s. 72, <http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900941_e.htm>

TORTIOUS OBLIGATIONS

NEGLIGENCE - OVERVIEW

Torts are violations of obligations individuals owe each other in society.

Negligence is a tort:

“The rule that you are to love your neighbour becomes in law you must not injure your neighbour; ... You must take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to injure your neighbour. Who, then, in law, is my neighbour? The answer seems to be - persons who are so closely and directly affected by my act that I ought reasonably to have them in contemplation as being so affected when I am directing my mind to the acts or omissions that are called in question.”

Donoghue v. Stevenson, [1932] A.C. 562 (H.L.)

We each owe other the legal obligation or duty to take reasonable care so as to avoid causing reasonably foreseeable harm to one another.

TORTIOUS OBLIGATIONS

NEGLIGENCE - OVERVIEW

ELEMENTS OF NEGLIGENCE:

Duty of Care

Duty of Care: An individual (Alice) owes a duty to Bob if Bob is sufficiently proximate that it is reasonably foreseeable that Alice's actions may impact on Bob. Unless there is a good reason not to have such a duty.

Standard of Care

Standard of Care: The Duty Alice owes to Bob is to take a certain level of care in her actions so as to avoid causing reasonably foreseeable harm to Bob.

Causation

Causation: It is not enough for Alice to fail to take adequate care in meeting a duty owed to Bob. Her failure to meet the standard of care in place must actually cause damage to Bob. Causation is more complex than simple cause and effect – if an effect is too remote, it will not be attributed to Alice

Damages/Injury

Damages/Injury: The loss caused by Alice's failure to meet the duty she owed Bob must be one that the law recognizes. Certain types of harms are not included in this category.

TORTIOUS OBLIGATIONS

NEGLIGENCE - OVERVIEW

ELEMENTS OF NEGLIGENCE:

Duty of Care

Standard of Care

Causation

Damages/Injury

What is a legal Injury?

- Typically limited to physical harm to body or property
- Only in rare circumstances: mental distress or pure monetary loss
 - Monetary loss is mostly included in situations where party A (Alice) owes some form of duty to party B (Bob) to provide Bob with accurate financial information. If Alice then makes a statement to Bob that is unreasonably wrong and Bob relies on this statement, Bob may succeed in suing Alice for any resulting financial loss.

Damages/Injury: The loss caused by Alice's failure to meet the duty she owed Bob must be one that the law recognizes. Certain types of harms are not included in this category.

TORTIOUS OBLIGATIONS

NEGLIGENCE – SOFTWARE DESIGN

ELEMENTS OF NEGLIGENCE:

FINANCIAL SOFTWARE:

Zhu v. Merrill Lynch HSBC: Online trading software glitch. User cancelled a transaction and received a 'cancelled' message. ML argued that 'cancelled' means the cancellation request has been sent, but does not confirm it has been received. For such confirmation, Zhu should have phoned to confirm.

Duty of Care: "It strikes me that the nature of the Defendant's services demands a higher duty of care and performance than ordinarily expected in the provision of services, because of the high risk of loss of a customer's investment monies."

Standard of Care: Greater care must be taken to ensure customers are not misinformed into believing their transactions have been cancelled when in fact cancellation remains 'pending'.

Causation: Zhu lost money as a direct result of his reliance on the statement made to him by the software: 'transaction cancelled'.

Damages/Injury: Zhu lost thousands as the stock price changes significantly after he 'cancelled' it.

TORTIOUS OBLIGATIONS

NEGLIGENCE – SOFTWARE DESIGN

ELEMENTS OF NEGLIGENCE:

COURT: “...an electronic system which is incapable of giving to a customer a simple instruction that he should not continue with a request for a trade or cancellation until he or she is advised specifically that the request has been successfully and completely dealt with, or that his transaction is pending until he is advised to the contrary, is in my opinion a faulty system...”

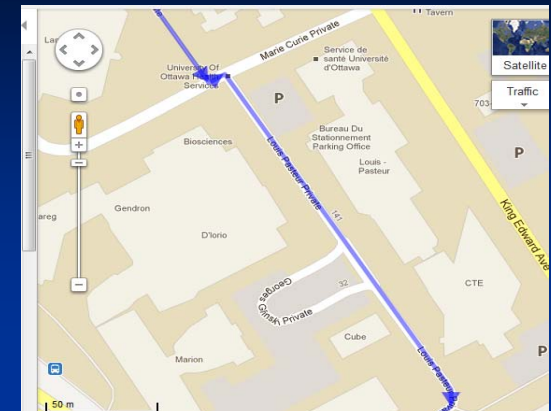
DESIGN ISSUE: Didn't include order/cancellation confirmation process in online trading software suite. Failed to take sufficient care not to cause foreseeable harm to their customers.

TORTIOUS OBLIGATIONS

NEGLIGENCE – SOFTWARE DESIGN

Rosenberg v. Harwood: Google Maps/GPS directions led plaintiff to a dangerous highway and busy highway. Once at the cusp of the highway, there was no other way to reach her destination (aside from restarting her entire journey). So Harwood attempted to cross and was hit by a car.

Google Maps, 2012, <maps.google.ca>



Duty of Care: While it was foreseeable that incorrect walking directions might lead individuals into dangerous situations, the relationship between the plaintiff and Google is too remote in this case for there to be a duty. Google publishes the same mapping information to everyone, and did not purport to provide direct information customized to Rosenberg's specific situation.

Standard of Care: Google is providing general mapping information. The travel route is prepared in an automated manner, based on closest travel route. To require Google to guarantee every route would be to impose too high a standard of care on the company, as it is impossible for it to verify every single route, so it would be open to unlimited liability. Even obligating Google to provide a 'warning' that routes may not be complete would be imposing too high a standard of care, as Google would be required to anticipate a wide range of dangers in a wide range of situations. Further, pedestrians have an obligation to look both ways before they cross the street. It is, in fact, illegal to cross a highway unless there is a crosswalk in place. Given this, the standard of care imposed on Google should be

“Google is clearly a publisher because it makes all of the information on the Google Maps service available to the public worldwide, and the fact that a user of the Google Maps service obtains customized search results does not remove the protections afforded to any other publisher of information to the public...Having established that Google is a publisher, it is apparent that the same policy considerations are present here as those in other cases that have rejected imposing a duty on publishers for providing faulty information. Chief among those considerations is the possibility that a publisher may be subject to liability to an unlimited number of individuals who may read or receive the information...”

Likewise, requiring Google to investigate its routes to ensure that every portion of the walking directions is safe would impose an onerous burden on Google. Indeed...some errors are "inevitable" in the publishing business...”

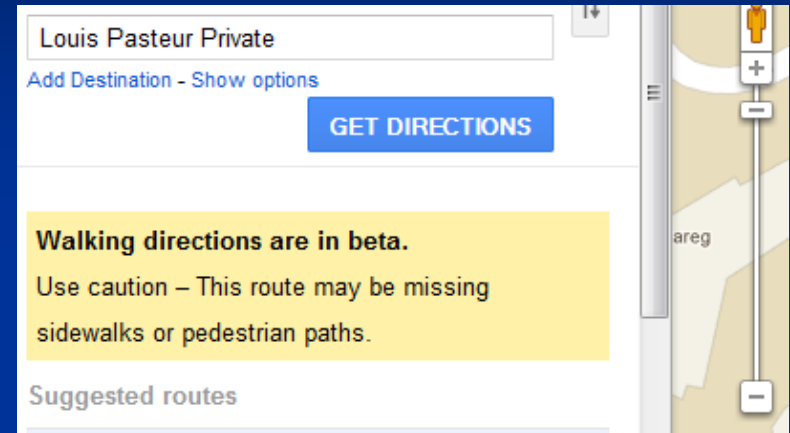
To impose the duties suggested by Rosenberg would reduce, if not eliminate, the duties already imposed on pedestrians. Thus, while imposing a duty on Google would make Google responsible for its own negligent actions, it would serve to diminish the responsibility that pedestrians have for their own safety, which does not serve the goal of making individuals accountable for their own errors.”

TORTIOUS OBLIGATIONS

NEGLIGENCE – SOFTWARE DESIGN

LIABILITY LIMITATIONS:

Software developers sometimes attempt to use contracts to absolve themselves of all obligations with respect to the product or service they are offering:



“MLHC will not be responsible or liable for any direct, indirect, special, incidental or consequential damages, or any other damages whatsoever, including without limitation, lost revenues, lost profits or loss of prospective economic advantage, resulting from use or misuse of this web site or the information, documents, software or content thereof, even if advised of the possibility of such damages or such damages are reasonably foreseeable.”

Zhu v. Merrill Lynch HSBC, [2002] B.C.J. No. 2883 (B.C. P.C.);

TORTIOUS OBLIGATIONS

NEGLIGENCE – SOFTWARE DESIGN

LIABILITY LIMITATIONS:

Duty of Care

Standard of Care

Causation

Damages/Injury

Courts will not always enforce such clauses:

“It strikes me that the Defendant's Legal Disclaimer falls into the category of an agreement which "virtually eliminates liability for inaccuracy in the performance of the services contracted for by the customer" and can be construed as in fact "exonerating the broker from acts of... gross negligence" and in fact reserving "the right to be grossly negligent" to the broker. On this basis I find the Legal Disclaimer of the Defendant unenforceable...The wording of clause 16 (h) of the agreement is almost such as to constitute the creation of a license fee for the defendant to be reckless in its provision of services...”

Zhu v. Merrill Lynch HSBC, [2002] B.C.J. No. 2883 (B.C. P.C.); Robert v. Versus Brokerage Services Inc., [2001] O.T.C. 232 (Ont. S.C.)

TORTIOUS OBLIGATIONS

NEGLIGENCE – SOFTWARE DESIGN

ELEMENTS OF NEGLIGENCE:

Duty of Care

Standard of Care

Causation

Damages/Injury

CYBERSECURITY???

- Often hastily put together with insufficient safety mechanisms
- This makes software operators susceptible to malware, spyware, but also to bot nets.
- Bot nets can be used to launch DDOS attacks on any other system or service, causing harm.
- Reasonably foreseeable?
- Remote?

Chandler: Software developers are the most **efficient** point in distribution chain to mitigate proliferation of bot nets,

J. Chandler, "Security in Cyberspace: Combatting Distributed Denial of Service Attacks", (2003) 1 UOLTJ 231, <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=596667>

GOVERNANCE/REGULATION

GOVERNANCE/REGULATION

EMERGING APPROACHES TO ICT GOVERNANCE:

*“All stakeholders have a role to play in improving trust on the Internet
Participants pointed out that all stakeholders have important roles to play in improving trust on the Internet: intermediary platforms are part of an ecosystem that also includes buyers / sellers, application developers, advertisers, merchants, law enforcement agencies and users. A strong multi-stakeholder partnership was viewed as crucial to address new policy issues by incentivising the entities capable of remedying policy problems, while preserving the open nature of the Internet.”*

OECD, “Workshop Summary: The Role of Internet intermediaries in Advancing Public Policy Objectives”, Conference held on June 16, 2010, in Paris, France, <<http://www.oecd.org/dataoecd/8/59/45997042.pdf>>

GOVERNANCE/REGULATION

GOVERNANCE/REGULATION

Things that get governments concerned:

- **DDOS ATTACKS:** Governments realizing importance of protecting critical infrastructure
 - Stuxnet virus in Iran
 - DDoS attacks post-wikileaks
 - Cybersecurity legislation pending?
- **ANTI-SPAM/PHISHING ACT**
 - Potential hefty fines for not explaining to users the potential foreseeable 'impacts' and functions of software

'Safeguarding life, health, property?'

- Residential/business software packages
- Stock exchange/Financial software
- Nuclear power plants
- Power grid
- Automobiles
- Internet/Critical Information Systems

THE END

Questions?

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