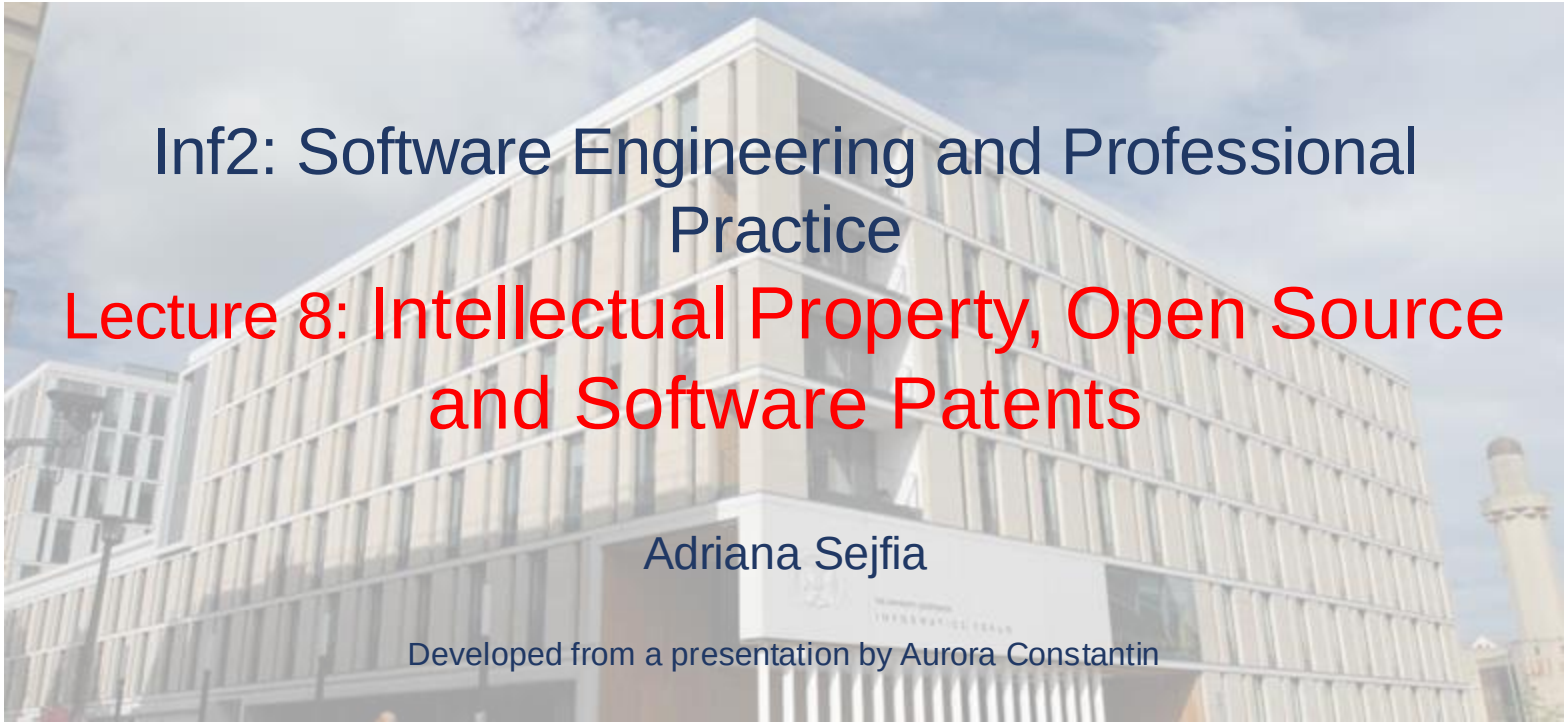

Inf2: Software Engineering and Professional Practice

Lecture 8: Intellectual Property, Open Source and Software Patents

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Developed from a presentation by Aurora Constantin

Intellectual Property (IP)

Outline

- IP Basics
  - what is IP? / IP ownership / protecting IP
- Copyright
  - basics – infringement / permitted acts
  - IT / computer programs / internet
- IP in Practice – Open Source Software licensing
- Patenting and computer programs
  - basics – requirements/monopoly right
  - patents & computer programs in UK/ Europe /US
- Useful reference – Thompson Reuter Practical Law on Software IP Protection

IP---Activity

Alex is exceptionally good at organizing and summarizing lecture notes. Alex decides to create comprehensive study guides based on the course lectures and textbooks for a particularly challenging computer science course. These study guides include summaries, infographics, and occasionally, Alex's own explanations to clarify complex topics.

Alex begins selling these study guides online to other students at different universities. The guides quickly become popular, helping many students understand difficult concepts better. However, the professor of the course discovers Alex's side business and raises concerns, as the guides are derived from her lecture material and the course textbook, which she partially authored.

What is IP?

- IP = Intellectual Property
- Result of creativity activity and/or innovation arising from human intellect
  - intangible
- Protected by Intellectual Property Rights – IPR
- Two main groups of IPRs:
  - permit / restrict a third parties rights to use your IP (copyright & related rights)
  - give a monopoly right (patents, trade marks)

Ownership of IP

- The creator of IP and the owner of IP are not necessarily the same
- Employers usually own their employees' IP (difference EU – UK, etc.)
- Can vary by contract
- Jointly owned by a number of creators
- Ownership transfer (assignation) must be in writing

Students and IP

As a general rule, original IP generated by a student during his or her studies is owned by the student

BUT:

- policy of each HEI differs
- commercially sponsored studentships
- contribution of HEI employees to IP
- some students are also employed researchers

Rights to Protect IP

- Copyright ©
  - applies to original literary, dramatic and musical works incl. software and computer-generated works
- Patenting
  - limited application to software
- Database right
- Others
  - trade marks (TM v ®), domain names, design rights, know-how, semiconductor topography rights

Rights to Protect IP

- Ideas
  - no automatic protection for ideas *per se*

- *More and more "process organizations" and "architectures to achieve a solution"*
  - *this way software is protected quite often indirectly*

Copyright

- What is copyright?
- Copyright in more detail
- Copyright and Information Technology

What is copyright?

- Copyright is an Intellectual Property Right
- Comes into existence with the (original) work
  - no need for registration
- Subject matter: literary, dramatic, musical and artistic works (LDMA) but not ideas *per se*
- Literary Works include computer programs and compilations

Copyright in more detail

- Who owns the copyright?
  - Author/Employee/Publisher
  - Not always straightforward
- Duration of Protection
  - Lifetime of author plus 70 years for LDMA works (Literary, Dramatic, Musical, Artistic)

Infringing Acts

Primary: individual

Secondary: commercial

- Copying the work
  - reproduction in any form including in an electronic medium and transient reproduction
- Issuing copies of the work to the public
- Rental / lending the work to the public
- Performing the work in public
- Communicating the work
- Adapting the work

Defences

- Sometimes described as “permitted acts”

Copyright and Information Technology

- Copyright and Computer Programs
- Copyright and the Internet
- Copyright and Databases
- Database Rights

Copyright and Computer Programs

- Copyright protection extended to computer programs in 1992
- Protection for lifetime of Author plus 70 years

Copyright and the Internet

- Shetland Times Case (is a headline used as a link protected?)
  http://www.internetlibrary.com/cases/lib_case60.cfm
- Copyright and Related Rights Regulations 2003
  - protection of technological measures to prevent unauthorised copying (not computer programs)
  - limitation of user rights (i.e. research exemption only for non-commercial research)
  - extension of reproduction and public communication right in digital context (transient reproduction)

Copyright and the Internet

- Challenges of modern Internet – YouTube etc
  - Need to obtain rights clearances
  - Control of uploaded material

- Especially during "Lock-Down" many people (especially Churches) struggled how to properly use copyrighted material (never done before)

Databases

- Database = "a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means"
- EU Databases Directive in 1996 = Copyright and Rights in Databases Regulations 1997
- Protection in two parts
  - copyright protection for "**structure**" of database
  - Structure = method of arrangement involving intellectual judgment
  - a new database - specific right for the **contents** of the database

Database Rights

- Right to maker of database to prevent unauthorised extraction/utilisation of the database contents
- Extraction
  - transfer of a substantial part of contents to another medium
- Re-utilisation
  - making available a substantial part of the contents to the public by distribution of copies
- Protection lasts for 15 years
  - living database = potentially indeterminate protection

Summary

- Copyright is oriented towards “works” like texts or plays or paintings...
- It does protect software
- Databases have more specific provision.

Copyright---Activity

Sophia and Jack are master's students in computer science at a university known for its cutting-edge research in artificial intelligence. They are working on their thesis project together, which involves developing an advanced predictive analytics tool that integrates machine learning techniques with real-time data processing. To make their project more efficient, Sophia suggests using a popular LLM, GPT-X, to aid in generating some of the initial code for data preprocessing and integration. Jack writes the initial prompts and feeds them into the LLM, which outputs several hundred lines of Python code. The students then refine and integrate this code, significantly enhancing the functionality with their algorithms focused on predictive modeling.

The predictive tool turns out to be highly effective, and their supervisor encourages them to publish their work and present it at an international conference.

Open Source (OS)

Overview

- Basics of software licensing
- What is OS?
- Key features of OS Licences
- Risks of OS and how to manage them

OS Importance

- Huge rise in revenue of Linux-based server hardware
- Two thirds of servers run on Apache OS software
- Ease of Management becomes a key factor in choice.

Software licensing and risk

- Businesses and academic researchers are risk managers
  - Avoiding copyright infringement
  - Not breaching the terms of software licences

- OS is an area of legal risks for developers and users
- 75% of developers "borrow" code from 3rd parties
- Evaluating risks is key to choice between OS and proprietary software

The need for licensing

- Intellectual Property in software
  - copyright
  - patents
  - database Rights
- Copyright Infringement
  - copying, using or storing the whole or a substantial part
  - quality, not quantity
- Software licences legitimise acts that would otherwise amount to copyright infringement

OS: the developer & business view

- Highly collaborative development model.
- Rapid evolution of software across the community.
- Cheaper alternative to proprietary software.
- Has moved to more organised models with quite stable communities.

OS: the legal view

- Just another type of software licence

- Typical features:
  - Full access to source code
  - Right to modify code and to distribute
  - 'Sharing' of modified code through the same terms
  - Little warranty protection
  - Licence often at no charge (but often with support charge)

Standard form Open Source (OS) Licences

- A range of standard form licences

- Some examples:
  - GPL – the Gnu General Public Licence
  - BSD – the Berkeley Software Distribution
  - MPL – Mozilla Public Licence
  - Apache, MIT, etc.

Key risks in OS licensing

- Risk 1 - IP infringement claim
  - IP Indemnity protection (or lack thereof)

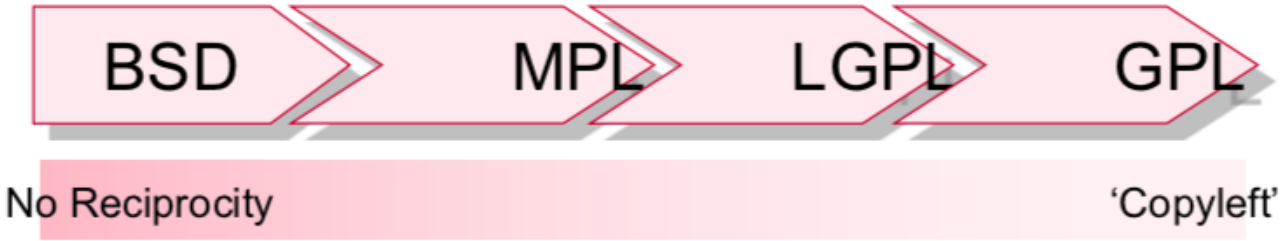
- Risk 2 - Limitations on onward exploitation
  - Reciprocity (the ‘forcing restriction’)
  - Managing the risk

Risk 1 - IP Infringement

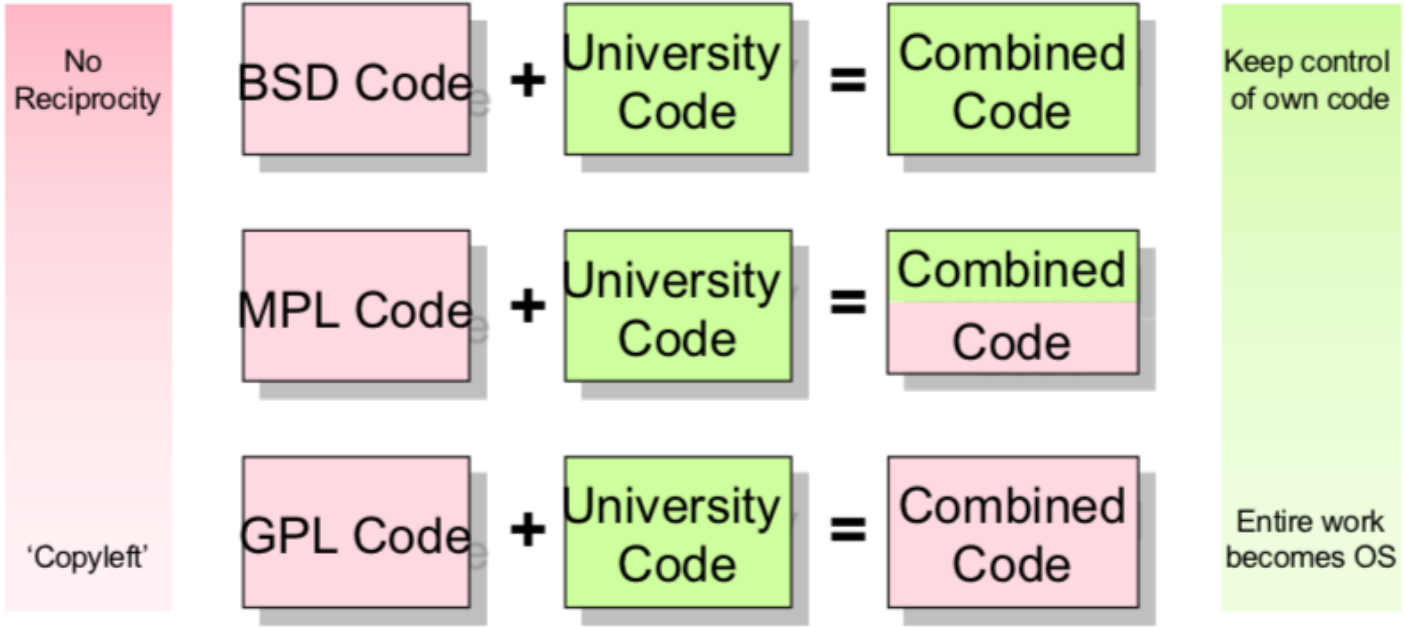
- Nature of OS development
  - Complex history with many contributors
  - Hobbyist developers may take ‘short-cuts’
- Potential for allegations of copyright infringement
- Potential risks / restrictions in onward exploitation of modified code
- Needs to be dealt with as an additional business risk

Risk 2 – Reciprocity (Developers Only)

- What happens if a university researchers uses OS in developing research results / new software?
- Do you have to license the derivative works on same basis?
- Main difference between Licences is treatment of derivative work



OS Licence Comparison



Managing Open Source Risk

- Create an internal OS policy
- Inform and educate developers / key relevant research groups
- Carry out an audit of open source use prior to exploitation of end "product"
- Create an audit trail for future use / licensee diligence
- Consider the risk in licensing on software containing open source code
- Reflect use of open source software in licence terms
  - Limited warranties / no indemnity
  - Include appropriate "reciprocity" provisions, if required

Summing up the risks of Open Source

- Approach to risk depends on whether you are:
  - an internal user / researcher using an OS product as a research tool only
  - a developer / researcher incorporating OS in software that is developed as a research output
- OS Licences are still software licences...
  - the risks will vary depending on which licence is used
  - proper due diligence means an effective, up front review of the agreement
  - reflect outcomes of review in contracts with third parties that are used to exploit the university's technology

Proprietary software licensing

- Supplier-biased terms
  - Tight licence grant (limited scope of use, number of users etc.)
  - Closed source
  - Licence Fees, royalties, duration and termination
  - Strict limitations on liability
- Customer-biased terms
  - Software warranties
  - IP Indemnities

Software Patents

Patenting

- Patent protection is granted to inventions
- It gives the patent holder a negative right of monopoly
- It is a deal between the 'inventor' and the State
- Useful reference: Thomson Reuters Practical Law on Software IP Protection – particularly useful on the difficult issues on patents

Patenting Basics – The Tests

Must be:

- Novel
  - not in public domain
- Non-obvious
  - not obvious to someone skilled in the art
- Have industrial application

Patenting Computer Programs

- Patenting computer programs is specifically excluded in many countries (like the UK and the EU). In many countries it is theoretically possible (US), but…

(*) https://www.dwt.com/blogs/startup-law-blog/2020/11/how-to-patent-software#:~:text=Under%20the%20current%20state%20of,and%20processes%20performed%20by%20it.

- Special "technical effect"
  - what is that?!

Patenting Computer Programs

- Patents **are** granted in respect of algorithms, special arrangements, architectures, etc.
- This is a kind of "work-around"

Patenting in the US

- Much more straightforward
- Possible to lodge claims covering the program itself
- Microsoft alone holds thousands of patents for computer programs
- In US more than 10,000 applications filed annually

Strictly Confidential

- Disclosure into the public domain prior to filing a patent application = lack of novelty for your invention
- Control disclosure of commercially sensitive/patentable technical information
- Use confidentiality agreements - 6 months novelty extension
- Disclose object code not source code

Summary

- Patents are straightforward in the US
- More and more things have software as part of the invention and so software is increasingly patented in Europe and the UK.
- But, the situation is still in flux. For a clear summary, see: https://fsfe.org/activities/swpat/swpat.en.html

Patents --- Activity

Suppose for example that a company has developed an innovative computer game called Spookcatcher. The game is marketed in packaging that features the name superimposed on the image of a ghost. It comes with an add-on device that the company has invented called a wailer. This attaches to the computer and emits very convincing ghostly wails at suitable points in the action. The software uses some clever data structures developed within the company that make it possible to achieve very high performance.

Bott, Frank. *Professional Issues in Information Technology*, BCS Learning