

7.4 Intellectual Property

In the situation at the beginning of the chapter, Alex was considering whether he should let Siti submit one of his old book reports as her own. Unfortunately, since the book report is meant to represent each student's individual work, it would be dishonest for Siti to claim Alex's work as her own.

Creative works such as Alex's book report, songs or computer programs take effort to create and are valuable as they benefit their owners. The owner of a song, for instance, can benefit from feeling entertained by listening to the song. This is similar to how physical property such as a chair or a house requires materials to produce and also benefit their owners. However, unlike physical property, some works are creations of the mind and can exist purely as data with no physical form. Such creative works are called **intellectual property**.

The owner of physical property such as a chair or a house can easily use locks or chains to prevent the property from being stolen or used by others without permission. However, it is not as easy to do the same for intellectual property such as music or computer programs. For instance, while it is easy to copy music files or programs from one computer to another, doing so may be illegal if the owner of this intellectual property disallows it. The legal right of owners to control the use and distribution of their intellectual property is called **copyright**. In particular, copyright protects programmers against theft, misuse and unauthorised copying of their software.

However, some owners may intentionally want to give away their intellectual property or to openly declare that they have granted permission for use of the intellectual property under certain conditions. An official description of activities that are authorised or forbidden by the owner of intellectual property is called a **licence**. While it is possible to write a licence from scratch, most intellectual property owners typically re-use existing licences. A wide range of licences with different levels of restrictiveness are available. A licence can also refer to the authorisation that is granted by the owner of the intellectual property after a fee is paid or certain conditions satisfied.

Key Terms

Copyright

The legal right of owners to control the use and distribution of their intellectual property

Intellectual property

Creations of the mind that have value but can exist purely as data with no physical form

Licence

Official description of activities that are authorised or forbidden by the owner of intellectual property

7.4.1 Types of Software Licences

It is important to understand the different types of software licences in order to avoid infringing copyright laws.

7.4.1.1 Public Domain

While it is not technically a licence, **public domain software** refers to software where the legal protections that are typically granted to intellectual property have either expired, been surrendered or are simply inapplicable. For instance, the first-ever program for running a web server was released in 1990 under the public domain. Some authors purposely release software under the public domain to benefit the public, while others are simply so old that the legal protections of copyright have expired.

Public domain software is not protected by copyright and anyone can legally copy, modify and distribute public domain software. Public domain software also need not always come with source code, although most do.

Key Terms

Free and open-source software (FOSS)

Software where users are given freedom to change, copy, study and share the software and its source code

Public domain software

Software where the legal protections that are typically granted to intellectual property have either expired, been surrendered or are simply inapplicable

7.4.1.2 Free and Open-Source

Free and open-source software (FOSS) refers to software where users are given freedom to change, copy, study and share the software. The “free” in “free software” refers to the freedom to use and not the price. Like public domain software, anyone can legally copy, modify and distribute FOSS. However, unlike public domain software, the software is still protected under copyright and the copyright owners may use this protection to require that the software must always be distributed with source code, that attribution to the original authors must always be provided or that any modifications must use a similar licence if they are also distributed.

Did you know?

There are many FOSS licences created by various institutions with varying levels of restrictiveness, such as the Apache License, the Berkeley Software Distribution (BSD) License, the Massachusetts Institute of Technology (MIT) License, the GNU Lesser General Public License (LGPL), and the GNU General Public License (GPL). Knowledge of these licences and the differences between them is not covered in this textbook.

Besides software, other kinds of copyrighted works such as books, photographs and music can be licensed in a similar manner using Creative Commons (CC) licences. Note, however, that while CC licences are similar to FOSS licences in granting users the freedom to copy, modify and distribute copyrighted works, CC licences are not designed for software and should not be used for this purpose. On the other hand, CC licences are suitable for licensing *content* that is delivered using software. For instance, higher-education course materials such as videos and notes created by universities and distributed for free on the Internet, also known as **open courseware**, often use CC licences.

The Linux operating system is an example of FOSS licensed under the GPL, in which the source code is freely available for modification. The Python interpreter used in Chapter 4 of this textbook is also distributed under an FOSS license.

7.4.1.3 Proprietary Software

Proprietary software usually refers to commercial software for which most of the legal protections under copyright are retained. In other words, unlike FOSS, it is usually *not* legal to copy, modify or distribute proprietary software. The terms and conditions for which the proprietary software may or may not be used under copyright protection law are usually communicated to users through an End User License Agreement (EULA) contract that the user must accept to use the software. In addition to these restrictions, the source code for proprietary software is usually kept secret.

While these restrictions may seem severe compared to FOSS licences, it is important to remember that software is a form of intellectual property and it is the right of the owner to be compensated (usually by selling licences) for use of the property.

The Windows operating system is an example of proprietary software where unauthorised copying is illegal and the majority of source code is kept secret.

7.4.1.4 Freeware and Shareware

Freeware is similar to proprietary software except that it is available for use at no cost. Some freeware are so-called “lite” versions of proprietary software, which allow users to try a limited version of the software while promoting the full version. Similarly, **shareware** is demonstration software that is distributed for free but for a specific evaluation period only. After the evaluation period, the program expires and the user can no longer access the program unless the user pays a registration fee.

Key Terms

Freeware

Proprietary software that is available for use at no cost

Open courseware

Higher-education course materials such as videos and notes created by universities and distributed for free on the Internet

Proprietary software

Commercial software for which most of the legal protections under copyright are retained

Shareware

Demonstration software that is distributed for free but for a specific evaluation period only

Like proprietary software, the source code for freeware and shareware is usually kept secret and modifying the software is usually illegal. However, unlike proprietary software, it may be legal to copy and distribute freeware and shareware. Adobe Reader and Skype are examples of freeware, while Camtasia Studio and WinRAR are examples of shareware.

7.4.2 Software Piracy

The crime of copying, distributing and/or using proprietary software illegally is called **software piracy**. Despite being illegal, software piracy is still prevalent and can take place in many forms. For instance, in 2015, a private school in Singapore and its director were fined \$38,000 for running proprietary training programs without a licence. Installing multiple copies of proprietary software without purchasing additional licences or sharing proprietary software with unlicensed users is considered software piracy and can result in similar legal repercussions. Software piracy causes significant loss of revenue for the owners of intellectual property, which in turn leads to higher prices for legitimate buyers.

Some users may unintentionally install pirated software without realising it. However, the distribution and installation of pirated software usually involves some unusual steps that should warn the user that something illegal is taking place. For instance, some software pirates may distribute the installation files through illegitimate websites or use programs called **cracks** to modify the proprietary software so that the software cannot detect that it is being used illegally. Pirated software for mobile phones may require users to perform complex steps to modify their phone before installation or to bypass the built-in software store for installation.

If you suspect that you have unintentionally installed pirated software on your computer or device, have a teacher or parent help you check whether the software you have installed is legal. In most cases, pirated software can be replaced with an alternative open-source program that uses a less restrictive licence and can be downloaded legally for free.

7.4.3 Copyright Infringement

Software piracy is an example of **copyright infringement**, which is the use or distribution of copyrighted work without the permission of the copyright owner. While software piracy is specific to software, copyright infringement can occur for any copyrighted materials, such as text or pictures that are on the Internet, and it is equivalent to theft.

Key Terms

Copyright infringement

Use or distribution of copyrighted work without the permission of the copyright owner

Crack

Program that modifies proprietary software so that the software cannot detect that it is being used illegally

Software piracy

Crime of copying, distributing and/or using proprietary software in a manner that is not permitted by its licence

In particular, users may even copy, modify or distribute copyrighted materials from the Internet without realising that they have committed copyright infringement. Such infringement is illegal even if the act of copying is unintentional. Students using materials from the Internet for schoolwork should adhere to the following guidelines to avoid committing copyright infringement:

1. Check and follow the website's terms and conditions.

Many websites state the terms and conditions for using the site's content, such as whether copying, downloading or hyperlinking to any materials is permitted. In some cases, the content may be under a licence, such as a CC licence, where such permissions are explicitly granted or denied. Otherwise, if no notice is present, it may be necessary to write to the copyright owners and seek written permission for use of the materials.

2. Limit reproduction of a copyrighted work to 10% (for educational purposes only).

For the special case of using copyrighted materials for research, study or other educational purposes, students may reproduce no more than 10% of the electronic edition of a work. The reproduced work should not be modified and must be properly cited to avoid plagiarism (see section 7.4.4).

3. Consider using public domain material instead.

Like public domain software, some works are released to the public domain on purpose or are so old that their copyrights have expired. Note that although these materials can be copied without the need to seek permission, it is still necessary to acknowledge or cite the authors appropriately to avoid plagiarism (see section 7.4.4).

7.4.4 Plagiarism

Related to copyright infringement is **plagiarism**. Plagiarism is the act of passing off someone else's original work as your own. In other words, it is the act of claiming to be the author of a piece of work without providing proper credit or attribution to the actual author. Unlike copyright infringement, plagiarism may not always be illegal, but it is nevertheless an act of dishonesty and is usually a punishable offence when detected in schoolwork.

Key Term

Plagiarism

Passing off someone else's original work as one's own

For example, in the situation at the beginning of this chapter, suppose Siti agrees to use one of Alex's old book reports as her own. Even if Alex gives Siti permission to do this, it is still plagiarism as the book report is meant to represent a student's individual work and Siti is falsely claiming to be the author of Alex's book report. This is *not* an example of copyright infringement, however, as the author Alex explicitly gave Siti permission to copy the work.

On the other hand, some cases of copyright infringement are also cases of plagiarism. For example, a student who copies more than 10% of copyrighted text and pictures from a website without the owner's permission and submits the copied materials in a school assignment without acknowledging the actual author is committing both copyright infringement and plagiarism. Such acts are illegal and dishonest.