Chapter 7 Ethics and Ownership

7.1 Ethics and Ownership

7 Ethics and Ownership	
7.1 Ethics and Ownership	
Candidates should be able to:	Notes and guidance
Show understanding of the need for and purpose of ethics as a computing professional	Understand the importance of joining a professional ethical body including BCS (British Computer Society), IEEE (Institute of Electrical and Electronic Engineers)
Show understanding of the need to act ethically and the impact of acting ethically or unethically for a given situation	
Show understanding of the need for copyright legislation	
Show understanding of the different types of software licencing and justify the use of a licence for a given situation	Licences to include free Software Foundation, the Open Source Initiative, shareware and commercial software
Show understanding of Artificial Intelligence (AI)	Understand the impact of AI including social, economic and environmental issues Understand the applications of AI

Ethics

- A system of moral principles
- That guides behavior and decision making
- Based on philosophical and religious values
- e.g. respectful and considerate behavior

As a computing professional, it is essential to understand the need for ethics. The purpose of ethics is to guide professionals in making responsible decisions that impact individuals, society, and organizations. By following ethical guidelines, computing professionals can ensure the development and use of technology that benefits society and minimizes harm. Additionally, ethical behavior helps to build trust, credibility, and professionalism within the field.

Why it is important to act ethically in relation to team members?

- To make sure the team members feel valued
- To get the best work out of the team
- To enable them to work well together
- To enable them to create the best product for the client

Case Scenario Questions

Sophie is about to join a job as a junior developer,

Ethical actions by which she'll feel confident in firm?

- Read about the languages she will be using
- Visits the office prior to starting
- Speaks to her manager about concerns

Ethical actions by which her manager can make sophie confident?

- Invite sophie in before starting
- Introduce her to team
- Give sophie a mentor

Ethical action her collegues can do to make her confident?

- Prepare a greeting
- Provide structured report
- Invite her to social events

Why's sofia asked to sign a professional code of conduct before starting work?

- Sophie is confirming that she understands the code of conduct
- To make sure she knows what sort of behaviour is expected from her
- To make sure she understands what consequences she'd have to face for some actions
- To ensure all employees adhere to the standards

Francis has been advised to join a professional ethical body.
Describe the benefits to Francis of joining a professional ethical body

- He has ethical guidelines to follow
  - … so clients/other staff know the standards being applied
  - … so he does not have to decide what is ethical it's written down
- Clients / staff know he is reputable
  - … recognition of his skills / knowledge
  - … there may be a test / requirements for entry
- They provide help and support
  - … for example if he needs legal advice
- They run training courses
  - … to keep his skills up-to-date

Copyright

- Formal or legal recognition of ownership of the program
- Intellection property rights to the program
- Protects against unauthorized reproduction of work
- Provides for legal right of redress

Need for copyright

- Copyright legislation protects the intellectual property of creators and encourages innovation and creativity.
- It allows creators to control how their works are used, distributed, and copied.
- Copyright laws prevent unauthorized copying and distribution of works, which can lead to financial losses and discourage further innovation.
- In the context of computer science, copyright laws protect software developers from having their code stolen or copied without permission.
- Software development requires a significant investment of time and resources, and developers deserve to be compensated for their efforts.
- The protection of software code helps to encourage further innovation by ensuring that developers can profit from their work and continue to invest in new projects.

Types of software licensing

Commercial

- Software is purchased before it can be used
- With a license that restricts the number of users
- Program code cannot be edited
- Anyone can download if agree to the terms
- Restricted use
- Software key required to install

Benefits of choosing commercial software for seller

- Can make money
- Can claim code's ownership
- Retains copyright
- Cannot be re distributed without seller's permission
- Prohibits any changes in the code
- Prevents unauthorized access, and prevents illegal copies being sold

Benefits of choosing commercial software for customers

- Support is readily available
- More robust software, since it's properly maintained,
- Forums also exist for commercial software
- The manufacturer develops patches that can be automatically updated

- Compatibility is inbuilt for this software

Shareware

- Software is provided with free trial
- Users do not have access to source code
- Users may re distribute the software

Benefits for customer to obtain a shareware

- Can check the program whether it meets the requirements of the user
- Can check whether it's worth to the spend money on it
- Shareware is free trial, so program can be checked without paying fee for a limited time

Open Source

- Software code comes with the software
- The user can modify software
- Once edited the software is re distributed with the changes

Why some programs are distributed under an open-source license.

- to allow users to customize the code
- to allow errors to be reported / identified / fixed by users
- to allow additional features to be added to the code
- to allow for collaboration

Freeware

- There is no charge for the software
- The software could still be copyrighted
- She can set her own restrictions on what a user can do with the program

Artificial Intelligence

Artificial intelligence (AI) is a machine or application which carries out a task that requires some degree of intelligence when carried out by a human being.

Social, Economic Impact of AI

As a result of increasing automation over the next few decades, the human race will need to consider the impacts that AI will have on society, the economy and the environment. So should we all be worried? In this section, we will consider a number of existing AI technologies, plus some predictions for the future, to help stimulate discussions. AI is not just about robots, but covers many areas (this is explored further in Chapter 18, which explores specific AI technologies in more depth). We will look at some of the areas in more depth and consider the implications of using AI (the descriptions that follow will mix up benefits and drawbacks

Artificial intelligence (AI) New developments in AI are constantly being announced and you are advised to keep up to date by checking out the many websites that keep an eye on AI development. Below are some of the developments and impacts that are currently expected to be seen in the near future.

Research has predicted that, by 2030, some 600 million jobs will be lost globally and as many as 400 million people will need to retrain or switch jobs – all caused by the inevitable advances in AI. The most likely jobs to be lost are those doing medium- and low-skilled work, but high-skilled jobs (such as hospital technicians, architects, engineers) are also at risk. This could lead to civil unrest with large numbers of young people out of work, with few or no employment prospects, unless they have a sought-after skill. History has shown, however, that previous technological advances all ended up creating a net increase in jobs. As automation takes over, jobs on the factory floor are lost, but production becomes much faster and more efficient, thus requiring an increase in the number people doing tasks that the automation process cannot yet do, such as quality control, test driving new vehicles and so on. Technology creates new jobs which are more interesting to humans than the manual jobs which are lost. However, history does not always repeat itself, so we need to prepare ourselves for a large reduction in employment and think about how to redistribute wealth so that the overall impact of AI will be positive. It is predicted that, eventually, 99% of all jobs could be eliminated since the increase in the use of AI is exponential – competition between countries and companies to expand their economies will continue to fuel this growth. One question that might be legitimately asked is,

'if 99% of jobs disappear, who will build the robots and maintain them?' To answer that question, let us consider a present-day solution to the question. 3D printers are actually now being designed and made by other 3D printers with no human interaction – the entire process is automatic with AI algorithms in control of the building, design and maintenance of these printers. So, it seems logical that other robots/machines will build and maintain future robots and other AI systems. An increase in AI will leave people with more time to pursue their hobbies and have a better lifestyle. Previous industrial revolutions have led to steep changes in the economies of countries that embrace the modern technology. Being left behind is not an economic option but is it a good environmental option? Improvements in AI technology can have a positive impact on the environment. Scientists now have more information than ever about what affects the environment. AI can help by finding patterns and interconnections within the thousands of data sets. This helps scientists make informed predictions about the environment and potential climate change. Since this analysis is overly complex, the use of AI systems can speed up this process

incredibly and allow the human race to take action much faster than they could by present methods. Here are some potential ways in which AI can help:

» AI can help us to conserve natural resources (for example, improve the conservation of water supplies).

Detection of pollution in the air and in the seas using AI is much more accurate, allowing scientists to pinpoint the source(s) of pollution more accurately and much faster.

» In the future it could be possible to combine weather forecasting and AI to allow for better predictions about renewable energy resources needed for the next few days. This would lead to a more precise automated renewable energy forecast using solar, tide, thermal and wind energy generation.

» AI would allow us to learn from nature's ecosystems by monitoring and modelling, for example, a river's ecosystem.

This would enable us to gain a better understanding of what can affect the delicate balance of life in the river. Such real-time environmental monitoring would allow us to quickly take remedial action before the affects became irreversible. AI would make this possible due to the ability to analyze vast amounts of very complex (inter-related) data.

Applications of AI

- the use of a language
- conducting a mathematical calculation or function
- recognizing a person's face
- the ability to operate machinery, such as a car, an airplane or a train
- analyzing data to predict the outcome of a future event, such as weather forecasting.
- Police identifying wanted people
    - Uses image recognition
    - ... to identify features/characteristics/items in an image
- Natural language interfaces
    - Use speech recognition to identify words that are spoken
    - ... and adapts to learn regional accents
- Self-driving cars
    - Detects its position on the road and within the traffic
    - Follows a route // Collision avoidance // Self-parking etc.
- Spoken Interfaces
    - Use natural language processing
    - ... to take a sentence and work out its meaning
- Game playing
    - Models characters in a computer game
    - to allow computer characters to react according to the player's
    - Movements
- Natural Language Processing (NLP): AI-powered NLP applications can analyze, understand, and generate human language. Examples include chatbots, language translation services, and voice assistants.

- Image Recognition: AI-powered image recognition technology is used to identify objects, people, and patterns in images and videos. Examples include facial recognition software, image-based search engines, and self-driving cars.
- Speech Recognition: AI-powered speech recognition technology can understand and interpret spoken language. Examples include speech-to-text software, virtual assistants like Siri and Alexa, and interactive voice response (IVR) systems.
- Fraud Detection: AI-powered fraud detection systems can analyze large volumes of data to identify patterns and detect potential fraud. Examples include credit card fraud detection, insurance claims fraud detection, and identity verification systems.
- Healthcare: AI is being used in healthcare to help diagnose and treat diseases. Examples include AI-powered diagnostic tools, predictive analytics for personalized treatment plans, and drug discovery.
- Finance: AI is being used in finance to automate tasks, detect fraud, and improve investment decisions. Examples include algorithmic trading, credit scoring, and fraud detection.
- Autonomous Vehicles: AI is powering the development of self-driving cars and other autonomous vehicles. This technology relies on sensors and algorithms to navigate and make decisions in real-time.
- Robotics: AI is being used to power robots in a variety of applications, from manufacturing and logistics to healthcare and entertainment. Examples include warehouse robots, surgical robots, and entertainment robots.
- Personalization: AI-powered personalization is being used to deliver tailored experiences to users in a variety of industries, from e-commerce to entertainment. Examples include personalized recommendations, targeted advertising, and customized content.
- Predictive Maintenance: AI-powered predictive maintenance systems can analyze data from equipment sensors to predict when maintenance is needed, reducing downtime and increasing efficiency. Examples include predictive maintenance in manufacturing, transportation, and energy.
-

How would the computer use Artificial Intelligence (AI) to play the board game

- The rules / past moves / decision making algorithms of the game will be stored
- The AI program is trained, by playing many times
- AI will look (ahead) at possible moves
- ... and/or analyse the pattern of past choices
- … and choose the move most likely to be successful
- Computer could learn how to improve // learn from previous mistakes
- … by storing the positive/negative result of choices
- ... and changing its future choices