UTM

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF ENGINEERING

SCHOOL OF COMPUTING

SECB 2103 – 01

BIOINFORMATICS 1

ASSIGNMENT 1

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HISTORY OF BIOINFORMATICS

Figure 1: Gregor Johann Mendel (1822–1884)

Gregor Johann Mendel, also known as the "Father of Modern Genetics," was born in 1822. Gregor Johann Mendel had introduced the basic principles of inheritance through the experiments in his garden. In his experiments, he discovered that the pea plants' offspring inherit certain traits from their parents in predictable patterns. The discovery laid the foundation for modern genetics and the study of inheritance (Editors, 2021). Mendel frequently conducts his experiments on pea plants. This is due to the ease with which pollen can be transferred using a paintbrush to control fertilisation. Furthermore, Mendel discovered seven distinct characteristics in pea plants, each of which has two variations. This includes height, pea colour, pod shape, seed shape and so on. Besides, Mendel also introduced the concept of dominant and recessive traits to explain how offspring inherit traits from their parents (Miko, 2008). Three laws have been established based on Mendel's experiments and discoveries: the law of segregation, the law of independent assortment, and the law of dominance (*Gregor Mendel (1822-1884)*). In a nutshell, Mendel made significant contributions to the field of inheritance, providing significant benefits to future generations.

Figure 2: James Watson

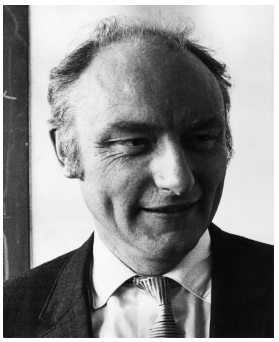

Figure 3: Francis Crick

Based on the findings done by Friedrich Michel, Phoebus Levene and Erwin Chargaff, Watson and Crick concluded that DNA molecules exist in the form of a three-dimensional double helix. (Prayer, L., 2008). Watson and Crick also realized that DNA consists of 2 sugar-phosphate backbones, with hydrogen bonds to hold the 2 nitrogenous bases. Watson and Crick found the DNA molecule can replicate itself and the information needed to make a new copy of the entire molecule contained in either chain will be used as a template for a new double helix DNA molecule. (Steven M. Carr, 2020, A&E Television Networks., 2021).

In 1821, Charles Babbage designed a machine that could count numbers. However, the lack of technology that led to this Difference Engine failed to be used. In 1848, the first computer program was written by Ada Lovelace and Lord Byron. In the early 20th century, the first electric only computer, the first digital computer and the first digital electronic computer was created. In 1945, the Electronic Numerical Integrator and Calculator (ENIAC) was built. In the last 20th century, computer and programming languages were developed. Moreover, computer chips and prototypes of modern computers were proposed. Then, UNIX, Intel, floppy disk, game console, Ethernet, etc were produced. In the 21st century, new operating systems and handheld devices have been introduced. (Williamson, T., 2021).

The Human Genome Project (HGP) was a huge task that entailed international collaboration and research by scientists from all over the world. The main goal of this project is to map and understand all of the human genes, also known as the genome, which were first introduced in 1988. The human genome is explained in three ways by the HGP researcher: determining the order or sequence of all bases in the genome's DNA; mapping to show the locations of the genes for major sections of the chromosomes; and producing linkage maps through inherited traits. This enables the tracking of certain genetic diseases across generations. The HGP has a number of benefits, including assisting in the discovery of approximately 20,500 human genes. This ultimate product serves as a global resource for detailed information on the structure, organisation, and function of the entire set of human genes. This data can be used to create a basic set of inheritable references for human development and function (*What is the Human Genome Project?*).

The Internet known as network of networks was first introduced in the 1970s in the United States. In the late 1950s and early 1960s, SABRE and AUTODIN I was implemented. The first host-to-host network connection computer, ARPANET was designed in 1969. Then, various protocols started to emerge. Ground-based and satellite-based packet networks were introduced, enabling wider connectivity. Then, DARPA introduced the Internetting program. Based on this, a new protocol, Transmission Control Protocol and a new system architecture had to be designed. In the 21st century, Web 2.0 which focuses on social networking and cloud computing was introduced and indirectly increased the use of wireless devices. (Dennis, M. A., n.d.).

The knowledge obtained from other researchers and the development of the Internet and technology playing an important role in Bioinformatics. The internet serves as a platform and a tool for bioinformaticians to utilise the information from the tremendous biology database. Meanwhile, the knowledge gained will give an idea and concept for bioinformaticians while doing research.

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