

This document is to serve as a guide to completing the “Cambridge AICE Computer Science” 2024 Summer Assignment. We will be learning the “AS” level of this course # 9618.

**Course Description from Cambridge:**

Cambridge International AS & A Level Computer Science encourages learners to meet the needs of higher education courses in computer science as well as twenty-first century digital employers. It encourages learners to think creatively, through applying practical programming solutions, demonstrating that they are effective uses of technology.

Learners develop computational thinking & programming skills to solve computer science problems. Cambridge International AS and A Level Computer Science will help learners develop a range of skills such as thinking creatively, analytically, logically and critically. They will also be able to appreciate the ethical issues that arise with current and emerging computing technologies.

**Here is a link to the Cambridge’s website that details the course:**

<https://www.cambridgeinternational.org/programmes-and-qualifications/cambridge-international-as-and-a-level-computer-science-9618/>

**Copy of the Syllabus -** <https://www.cambridgeinternational.org/Images/518133-2021-2023-syllabus-update.pdf>

**Summer Assignment:**

- 1.) View the first five (5) episodes of the YouTube tutorial listed below:

MrBrownCS – Computer Systems

[https://www.youtube.com/watch?v=uMDQiZg8rWE&list=PL04uZ7242\\_M60Z2F8qV7sld99cuwV\\_Z3T](https://www.youtube.com/watch?v=uMDQiZg8rWE&list=PL04uZ7242_M60Z2F8qV7sld99cuwV_Z3T)

- 2.) Complete the attached worksheet: (use may use the web to research)

# Worksheet 1.1: for testing basic understanding

- 1 Select the binary and hexadecimal representations of the denary number 62 from the following options:
  - A 11111001
  - B 00011111
  - C 00111110
  - D 1F
  - E 3E
  - F 3D
  
- 2 The eight-bit code 10010001 could represent a number of values depending on the coding scheme being used. Select from the following the one value that it could **not** represent.
  - A 145
  - B 91
  - C 17
  - D -111

<b>3</b>			$2^4$			$2^1$	
					4s	2s	
1	0	1	0	0	1	1	0

- a The last row in the above table shows a binary code. Fill in the top two rows of the table, assuming that the code represents a binary number.
  - b If this binary code represents an unsigned integer, is the denary equivalent an even or an odd number? Explain your reason.
  - c If this binary code represents an unsigned integer, give the denary equivalent.
  - d If this binary code represents a two's complement representation of a signed integer, does it represent a negative or positive number? Explain your reason.
  - e Give the denary equivalent of this two's complement representation.
- 4 If the denary number 373 is to be converted to a binary representation, how many bits will be needed? Explain your reason.
  - 5 A car has an odometer (measuring distance travelled in kilometres) At the start of a journey it shows 99940 and at the end of the journey shows 00230.
    - a Use common sense reasoning to find the distance travelled.

- b** Try calculating this by subtracting 99940 from 00230 using a calculator or spreadsheet. What is the problem?
- c** Nine's complement is defined as the number obtained by subtracting each digit from nine. Ten's complement is obtained by adding one to the nine's complement. Show a calculation to get the correct answer by converting the 99940 to its nine's complement then to its ten's complement and then adding this to 00230.
- 6** A bitmap has an image stored that has resolution of  $1024 \times 768$  and a colour depth of 8. Another file contains a five-minute soundtrack stored using a sampling rate of 100 samples per second and a sampling resolution of 16.
- Which file is the larger one?
- 7** Give **one** example where lossy compression will be useful and one example where lossless compression is essential.