COULSDON
SIXTH FORM COLLEGE

Faculty of Computing, IT and Creative Media

SUMMER ASSIGNMENT

Student Name: _____

BTEC Computing

QUALIFICATION NAME:

BTEC Level 3 National <u>Extended Certificate</u> in Computing

BTEC Level 3 National <u>Certificate</u> in Computing

WEB LINK: <u>https://qualifications.pearson.com/en/qualifications/btec-nationals/computing-2016.coursematerials.html#%2FfilterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments</u>

UNITS TO BE COMPLETED FOR <u>EXTENDED CERTIFICATE</u> YEAR1:

- Unit1: Principles of Computer science (Exam)
- Unit2: Fundamentals of computer science (Exam)
- Unit7: IT security and encryption (coursework)
- Unit11: Digital graphics and animation (coursework)

UNITS TO BE COMPLETED FOR <u>CERTIFICATE</u> YEAR1:

- Unit2: Fundamentals of computer science (Exam)
- Unit7: IT security and encryption (coursework)

UNIT 1
PRINCIPLE OF COMPUTER SCIENCE

Scenario

The first part of this Summer Assignment explains how to convert a decimal whole number into its binary equivalent.

Number	Quotient	Remainder
8	8/2 = 4	0
	4/2 = 2	0
	2/2 = 1	0
	1/2 = 0	1

The number to be converted

There are remainders recorded from repetitively dividing the quotients.

Since "Bi" means two therefore divide 8 by 2 to get 4 (quotient) and remainder 0. Divide the Quotient (4) by 2 and record remainder 0. Repeat the process until the quontient is 0.

The exemplar shown below is a worksheet showing the mechanical way of achieving the same thing explained above, converting a whole number to its binary equivalent.

	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^6	2^7
Enter number	1	2	4	8	16	32	64	128	256
5	1	0	1	0	0	0	0	0	0
7	1	1	1	0	0	0	0	0	0
25	1	0	0	1	1	0	0	0	0

Worked example

To obtain the binary value of **5** you need to do the following

1 x 1 **+** 0 x 2 **+** 1 x 4 **+** 0 x 8 **+** 0 x 16 **+** 0 x 32 **+** 0 x 64 **+** 0 x 128 **+** 0 x 256 **=** 5

Activity 1

Complete the follow worksheet by working the binaries of the following numbers given in the first column of the worksheet.

	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^6	2^7
Enter number	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**
5	1	0	1	0	0	0	0	0	0
45									
67									
75									
87									
125									
200									

Activity 2

Show calculations to show how you obtained your binary values in your worksheet.

This section explains one important concept of programming that you will be expected to know in software development. The concept that will be covered in this section is known as the *While Loop*.

The While Loop

With the While loop we can execute a set of statements as long as a condition is true. Let's see how Python's while statement is used to construct loops. We'll start simple and embellish as we go.

The format of a rudimentary While loop is shown below:

```
while <expr>:
    <statement(s)>
<statement(s)>
```

represents the block to be repeatedly executed, often referred to as the body of the loop. This is denoted with indentation, just as in an if statement.

Remember: All control structures in Python use indentation to define blocks.

The controlling expression, **<expr>,** typically involves *one* or *more variables* that are initialized prior to starting the loop and then modified somewhere in the loop body.

When a while loop is encountered, **<expr>** is first evaluated to check if it is true or false. If it is true, the loop body is executed. The, **<expr>** is checked again, and if still true, the

body is executed again. This continues until, **<expr>** becomes *false*, at which point program execution proceeds to the first statement beyond the loop body.

Consider this loop:

```
>>>
 1 n = 5
 2 while n > 0:
 3     n -= 1
 4     print(n)
 5 print("n is no longer greater than 0. Hence exit while loop")
 6 4
 7 3
 8 2
 9 1
10 0
```

Here's what's happening in the example above:

- n is initially 5. The expression in the while statement header on line 2 is n > 0, which is true, so the loop body executes. Inside the loop body on line 3, n is decremented by 1 to 4, and then printed in line 6.
- When the body of the loop has finished, program execution returns to the top of the loop at line 2, and the expression is evaluated again. It is still true, so the body executes again, and 3 is printed. See line 7.
- This continues until **n** becomes 0. At that point, when the expression is tested, it is *false*, and the loop terminates. Execution would resume at the first statement following the loop body, line 5 in this case.

Activity 2
Study the code below and write the output the code produces

```
i = 1
while i < 6:
    print(i)
    i += 1
```

Activity 3
Study the code below and write the output the code produces:

```
i = 1
while i < 6:
    print(i)
    i = i + 1
```

Activity 4
Study the code below and write the output the code produces:

```
n = 5
while n > 0:
    print(n)
    n = n - 1
    If n==0:
        Exit
```

Activity 5
Write a program in Python, using the *While* statement, that will convert whole number to its binary equivalent binary

e.g., **9** converts to **1001**.

EXTENSION TASK

Study the purpose of **For** Loop. Write the differences between **While** loop and **For** loop.

UNIT 7
IT SECURITY AND ENCRYTION

Since the **COVID-19 pandemic**, many IT system have be targeted by **cyber criminals** and there have been reports in the news that the Office for National Statistics reported an increase in **cybercrime** offences. Your local charity director has approached you to **investigate** and **report** on current **security threats** to their web site and systems. He has also asked you to investigate encryption methods and how these could be used to keep their web site and systems secure.

Write a **report** in which you:

- **explain** the current IT security threats to which organisations are exposed. Investigate the following websites to gather information on the current security issues.
    - BBC news (Technology section)
    - Biggest Security Threats of 2017
    - ITProportal.com

- Investigate the organisational activity known as **Bring You Own Device** (BYOD).
Complete a *short report* on:
- What is BYOD and why it may be useful
- Why BYOD may be a security threat in an organisation (Risks & disadvantages)
- How BYOD can be dealt with (using organisational policies and procedure)

REMEMBER TO REFERENCE YOUR WORK BY QUOTING YOUR SOURCE OF INFORMATION TO AVOID PLAGIARISM.

How do I Create and Format Harvard Style In-text References?

When adopting [Harvard style referencing](#) in your work, if you are inserting a quote, statement, statistic or any other kind of source information into the main body of your essay you should:

- Provide the author's surname and date of publication in brackets right after the taken information or at the end of the sentence.

    Example:

    There are many assumptions when it comes to the information processing approach to cognition… (Lutz and Huitt, 2004).

- If you have already mentioned the author in the sentence, you should enter only the year of publication in brackets directly after where the author's surname is mentioned.

    Example:

    In the overview of these developmental theories, Lutz and Huitt (2004) suggest that…

- If you are quoting a particular section of the source (rather than the entire work), you should also include a page number or page range within the brackets after the date.

    Example:

    "...the development of meaning is more important than the acquisition of a large set of knowledge or skills ..." (Lutz and Huitt, 2004, p. 8), which means that ...

- Note that if the source has four or more authors, you do not need to write out all of their surnames; simply use the first author's surname followed by the abbreviation 'et al.' (meaning 'and others') in italics.

HTTPS://WWW.CITETHISFORME.COM/UK/REFERENCING-GENERATOR/HARVARD

UNIT 11
DIGITAL GRAPHICS & ANIMATION

Scenario

You are hoping to enter the creative computing sector as a junior digital designer and have seen an advertisement for a job at KingAlumni Digital that you think will be suitable.

KingAlumni Digital are a digital design company that create digital interactive products for a range of clients. **You have been invited to attend an interview at the company's main office.**

As part of the recruitment process you have been asked to demonstrate that you have the appropriate level of understanding of the core knowledge of this area of creative computing.

Before the interview you must produce a report, based on your own individual research, on the techniques used to store, process and create graphics and animation in digital format, and the implications of using digital data to represent these types of images.

a) The report should include an evaluation of how the characteristics of 2D and 3D digital images impact on their application and use. The evaluation should consider how representing graphics and animation in digital format impacts on the image data. Your evaluation should use specific examples covering:

- Raster Images and their features and characteristics
- Vector images and their features and characteristics
- Coordinate systems used in 3D images

b) As part of the report you must analyse the use of digital images and animation in a number of different contexts and purposes (e.g. education, entertainment, advertisement, illustration etc). You should ensure your examples allow you to explore a range of target platforms and media (digital and print).

c) You must evaluate the use and effectiveness of techniques used to produce the identified digital images and animations. The evaluation should include assessments of:

- the uses and applications of at least 5 digital animation techniques (e.g. Tweening, wire framing, behavioural animation etc.) and the implications of using techniques for producing animated products in different contexts.
- how representing images in digital format impacted on the image data including the mathematical principles used to generate digital images and animations.
- the use of the graphics and animation and the effect on the audience, including the impact of the computational processes on their use and storage; exploring ways that the storage and representation of digital images can be improved to better suit the identified users, audience and scenarios.
- the impact the uses and purpose of the digital images and animations have on the content, characteristics and features of the images and animation in the identified examples, including consideration of intended target platform, the target medium and any interactive features.

Relevant legal and ethical considerations when using digital images and animations, including the use of assets created by others, privacy etc.

TASK 1

Research the difference between **vector** and **raster** files

1. In your own words describe what vector images are!

   _____

   _____

2. In your own words describe what Bitmap images are!

   _____

   _____

3. Give 3 examples of Bitmap file formats!

   _____

   _____

   _____

4. Give 3 examples of Vector file formats!

   _____

   _____

   _____

5. What is the difference between lossless and lossy?

   _____

   _____

   _____

TASK 1
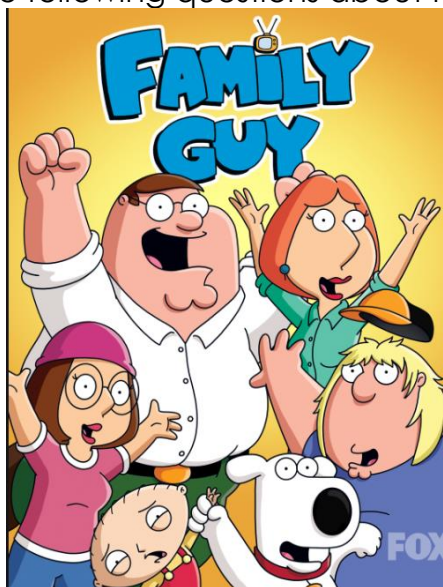
TASK 2

Think about animation used in Adverts

Answer the following questions about the Evian Advert:

1. What animation does the advert use?
2. Who is the target audience?
3. What could be the legal impacts?

Think about animation used for TV

Answer the following questions about Family Guy:

1. What animation does the advert use?
2. Who is the target audience?
3. What could be the legal impacts?

EXTENSION TASK

How effective is the animation in the advert in TV show listed above? Produce a 500 words report.