

Saracens High School



SARACENS
HIGH SCHOOL

T-Level **Digital Production,** **Design and Development** **Transition booklet**

Name: _____

Tell me about yourself

Why did you choose Digital Production, Design and Development?

In this simple task you get the opportunity to tell me your choices and reasons behind choosing to study Computer Science. Please answer all questions as best you can.

1. Why did you choose to study T-Level Digital Production, Design and Development?

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2. What are you hoping to achieve from studying Digital Production, Design and Development?

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3. How would you describe yourself as a learner at GCSE? What skills were you good at, what areas would you like to improve on?

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4. What are your other hobbies and interests outside of school? Anything relating to Computing?

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Independent research task

Emerging computer technology

In this task you get to investigate any area of emerging computer technology which interests you.

You can pick any area which interests you, but examples include:

- Artificial intelligence
- Robotics
- Automate self-driving cars
- Quantum computing

In no more than ONE side of A4 summarise the area you have chosen under the following four headings:

1. What is it?
2. What are the possible Social, Moral, Cultural and Ethical benefits of the technology on society
3. What are the possible Social, Moral, Cultural and Ethical risks of the technology on society
4. My conclusion on this technology and what it will mean for our world 10 years from now

Additional help:

For additional help and support in structuring your answer you might like to watch some of the videos for the following Craig 'n' Dave playlists:

SLR 17 – Ethical, morale and cultural issues

<https://student.craigndave.org/videos/slr-17-ethical-moral-and-cultural-issues>

What is “computational thinking”?

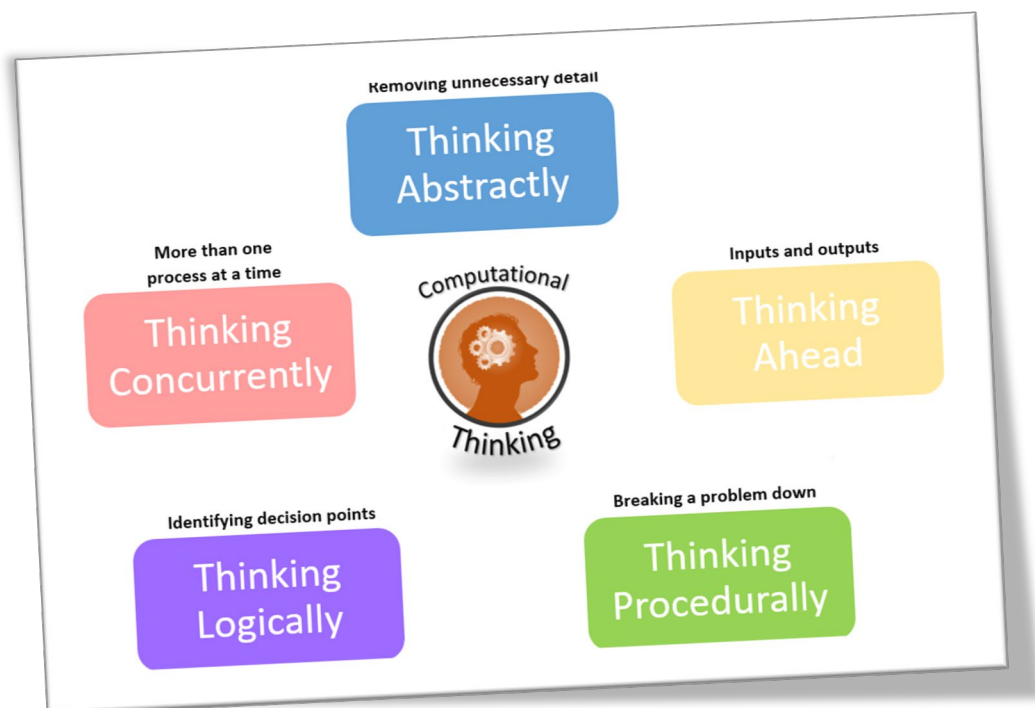
Thinking like a computer

At the heart of Computer Science is the ability to look at problems, analyse them, break them down, and solve them in a way which involve a variety of “Computational Thinking” skills.

Using the Computational thinking and Computational method placemats. Create your own spider diagram / mind map which shows your clear understanding of the 5 different computational thinking strands. Keep it to a single side of A4.

Your goal is to imagine someone else must revise from your mind map. Ask yourself:

- Does it make sense?
- Is it clear?
- Does it cover all the important concepts?





Computational Thinking

Aspect	Exam board definition	Meaning	Theoretical Positives/Negatives	Simple Illustrations
Thinking abstractly	Removing unnecessary details and including only the relevant details.	Identifying what does and doesn't matter to solving the problem. The idea of layering or levels of a problem. Deciding what variables & objects will be needed.	+ Allows you to make predictions. - It may be difficult to predict markets, users, trends and technical influences. - Too many variables may mean the scenario is too complex to model accurately.	Symbols on a map showing buildings, roads etc. Charting where an Oyster card is checked in and out on the London Underground. Moving nodes on a graph data structure to change the visualisation.
Thinking ahead	Identifying the preconditions of a system, the inputs, outputs and reusable components.	What you need before you get going. Identifying the inputs. Identifying the outputs. Caching: Identifying what is required before it is needed. Identifying reusable program components.	+ Caching can speed up a process. - Caching can be complicated to implement. - Caching requires the correct data to be fetched for the next instruction.	Working out how much paint you need before starting to decorate. Getting all the tools ready for a DIY job in advance. Getting your wallet out before the cashier tells you the bill.
Thinking procedurally	Breaking a problem down.	Identifying a number of smaller sub-problems. Determine the order of events.	- May not be entirely possible with an event driven rather than procedural approach to programming.	Generating a subject grade requires putting marks into a system, before applying a grade boundary, before printing results.
Thinking logically	Identifying decision points for branching or iteration.	Identify the points at which a decision is needed. Determine the conditions of the decision. Determine the next steps depending on the outcome of the decision.	+ The complexity of an algorithm can be determined.	Using a flowchart to design an algorithm.
Thinking concurrently	More than one thing happening at the same time.	Identifying if parts of the problem can be tackled at the same time.	+ Concurrency speeds up the solution. - May be difficult to program. - Problem may not suit concurrency.	Building a house: ordering the windows, whilst putting up the walls.



Computational Methods

Aspect	Exam board definition	Meaning	Theoretical Positives/Negatives	Simple Illustrations
Problem recognition	Knowing what the problem is.	Identifying the key requirements of a solution.	- Not all problems can easily be solved by a computer.	Identifying the requirements of a mortgage calculator.
Backtracking	Going back to a previously successful match to find another solution.	Trying an alternative approach if needed.	+ Good for solving logic problems and providing artificial intelligence algorithms. - Only useful for sequential problems.	Mobile phone won't send an email. Going back to check Wi-Fi is enabled, and the internet connection.
Data Mining	The analysis of a large amount of data to provide new information.	Looking for deeper meanings, not obvious conclusions in available data.	+ Advantage can be gained if you can spot unexpected trends and patterns. + Anomaly detection.	Working out that nappies are often bought by men. Putting beer next to nappies increases the sale of beer.
Heuristics	A best guess to problem solving to reduce computation time.	Approximating solutions to ensure a balance between time spent on solving the problem and getting to the best possible solution.	The best solution may take too long, or be too expensive to achieve. Sometimes a solution that may not be the best, works out OK.	Estimating congestion when route planning.
Performance modelling	Carrying out mathematical analysis to assess efficiency.	Knowing how well a solution will perform before full implementation. Building models to test scenarios.	+ Simulations predict outcomes. + Cost effective, time saving & safety first approach. - Requires accurate data. Statistics (relevant data) is used to build the model. Randomisation may be needed to model uncertainty.	Not testing a new exam system on the day exam results are due to be published. Not testing a new London Underground system for train management during rush hour.
Pipelining	The output of one process is the input to another. Queuing up processes.	Some processes must be achieved one after another.	+ Can speed up the execution. - Decisions & branches can mean the pipeline has to be reset, as the next process is no longer the one to be done next.	Mix the cake ingredients. Bake the cake. Let it cool. Put on the icing.

Visualisation	Visualisation is a representation of reality using symbols, charts and colour.	Using diagrams to represent data for analysis. Modelling scenarios and comparing to visible reality.	+ Data is more easy to read if it is presented in a visual way. + May be easier to spot trends, patterns and relationships between different items of data.	Using diagrams to represent programs: systems diagrams, class diagrams and flowcharts.
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Thinking
Abstractly

- Removing unnecessary detail

Thinking
Ahead

- Inputs and outputs

Thinking
Procedurally

- Breaking a problem down

Thinking
Logically

- Identifying decision points

Thinking
Concurrently

- More than one process at a time

Mind map for Computational thinking

Note taking practice task

The Cornell method of note taking

The expectation to do independent research at A-Level will increase dramatically from GCSE.

There is a real skill to taking decent notes outside of lesson which are of value. Research has proven that one of the most effective methods is the "Cornell" note taking method.

Using the Cornell note taking template on the following pages. Pick two of the following videos from Craig 'n' Dave:

- OCR: <https://student.craigdave.org/videos/ocr-alevel-slr01-alu-cu-registers-and-buses>
- OCR: <https://student.craigdave.org/videos/ocr-alevel-slr04-paging-segmentation-and-virtual-memory>
- OCR: <https://student.craigdave.org/videos/ocr-alevel-slr05-stages-of-compilation>
- OCR: <https://student.craigdave.org/videos/ocr-alevel-slr14-data-structures-part-2-graphs>

Write the title of the videos and its topic in the top boxes (use a different sheet for each video)

In the main "Notes" section, write notes from the video. You can do this in any way you like, a suggestion might be to rewind slightly when the canvas changes, thinking carefully about what was important in previous few minutes.

Having recorded the notes, review them:

- Turn each part into a question in the section on the left
- For example, the notes may say, "The value of the program counter is passed to the memory address register"
- The question then becomes, "Which register is the value of the program counter passed to?"
- Sometimes these questions are easy, and at times they are more difficult to write
- There may also be more than one valid question
- You will need to decide for yourself which are the most appropriate questions for revision

Finally pull out all the keywords and their definitions words the notes and list them in the bottom section.

Video Title:	Topic/SLR:
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Questions	Notes
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Key Terms	

Video Title:

Topic/SLR:

Questions

Notes

Key Terms

Video Title:	Topic/SLR:
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Questions	Notes
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Key Terms	

Video Title:	Topic/SLR:
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Questions	Notes
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Key Terms	

Key terms task

Getting to grips with terminology

An important aspect of being successful with your study of Digital production, design and development is getting to grips with subject related terminology.

Below are a handful of the key terms you will need to become familiar with:

Control Unit	Register	Operating System
Von Neumann	Optical Storage	Compiler
Architecture	Device Driver	Lossy Compression
Intermediate Code	Machine Code	TCP/IP Stack
Assembly language	Normalisation	Problem
Hashing	ASCII	Decomposition
Packet Switching	Busses	

1. Research each of the key terms and write a definition
2. Resist the urge to simply copy a definition from the first website you find. Many definitions found on The Internet are overly complicated and wordy
3. Ask yourself:
 - Does my definition make sense?
 - Is it succinct, to the point?
 - Does the definition have appropriate depth and detail for 'A'-Level?
 - Could I give this definition to another student so they could revise from it?

Keyword	Definition
Control Unit	
Von Neumann Architecture	
Intermediate Code	
Assembly language	
Hashing	
Packet Switching	
Register	
Optical Storage	
Device Driver	
Machine Code	
Normalisation	

ASCII	
Busses	
Operating System	
Compiler	
Lossy Compression	
TCP/IP Stack	
Problem Decomposition	

An introduction to the basics of programming

Programming basics

Learning to “code” is a fun and essential part of the A-Level Computer Science.

1. Head over to the website: <https://www.learnpython.org/>
2. Complete the following python tutorials under the heading:
 - a. Hello, World!
 - b. Variables and Types
 - c. Lists
 - d. Basic Operators
 - e. String formatting
 - f. Basic string operations
 - g. Conditions
 - h. Loops
 - i. Functions
 - j. Classes and Objects
 - k. Dictionaries
 - l. Modules and packages
3. Each section presents you with theory, code to run and exercises to try out
4. Install Visual Studio Code onto your home Computers and have a look around at all the features

Reading and investigation project

An important part of T-Level Production, Design and Development is being able to apply your subject knowledge to different businesses in different situations. Read the case study on New Look and answer the questions below.

New Look slashes prices amid sharp fall in annual sales Fashion chain New Look is continuing to cut prices as it tries to turn around its business.

New Look wants 80% of its clothes to sell for less than £20. The price cuts come amid falling sales. Like-for-like sales plunged by 11.7% in the financial year which ended in March, and website sales tumbled 19%.

New Look is one of many retailers this year that struck a Company Voluntary Agreement (CVA) under which a company buys time to sort out its debts. It is trying to broaden its appeal to include older customers, giving it an age target range of between 18 and 45.

Results from New Look, which has hundreds of stores and has been a High Street presence since 1969, contrast sharply with online rival Boohoo, which also reported results. Sales of its three brands, Boohoo, PrettyLittleThing and Nasty Gal were 53% higher in the most recent quarter compared with the same quarter last year.

Boohoo brands target customers aged between 18 and 28, with clothes priced at about £15.

New Look vs Boohoo By Karen Hoggan, business reporter

What's behind the stark contrast in the fortunes of New Look and Boohoo? Is it just that New Look is saddled with an expensive High Street presence, while Boohoo is online only? Actually, it seems to go deeper than that. New Look's online business had a bad year as well.

Charlotte Pearce, retail analyst at GlobalData, says New Look's poor performance is a result of its "loss of relevance" among UK shoppers over the last couple of years.

New Look is broadly targeting the 16-44 year old shopper, while Boohoo and its other brands PrettyLittleThing and Nasty Gal are all much more narrowly focused on 16-24 year olds. By trying to appeal to too many different shoppers, New Look has ended up appealing to none as "its proposition is unclear", says Ms Peace.

She also says New Look's product ranges "lack excitement and its product is much safer" compared with the "daring" designs of the online-only fashion retailers. Retailers like Boohoo are "more in tune with millennials in terms of providing trend-led and boundary-pushing fast fashion," she says.

As a result she reckons New Look would "struggle" to lure back these 16-24 [year old] shoppers because it hasn't kept up with the likes of Boohoo. However, Ms Pearce doesn't think New Look should be putting effort into trying to recapture the younger shoppers who have been lured away by Boohoo and others because the competition is so "intense".

Instead she says New Look needs to adjust its target customer base to focus on the older 25-34 year olds. Clothing retailer Ted Baker also released profits on Tuesday. Its half-year sales were up 4%, mainly thanks to growth in its online sales.

New Look also booked a one-off cost of £34m, partly for discounting old stock. The company said it had made "significant progress", which will be reflected in next year's results.

Last November it brought back Alistair McGeorge, who ran the business between 2012 and 2014. Mr McGeorge said: "Last year was undoubtedly very difficult for New Look, with a well-documented combination of external and self-inflicted issues impacting our performance. "We still have more work to do to restore long-term profitability, but I am confident we are now better placed to achieve this than we were when I returned to the business over six months ago."

Under its turnaround plan, the company is cutting 1,000 jobs and closing 60 stores. The plan will cut the fashion chain's rents by between 15% to 55% across its remaining 393 stores. Last month, the company hit the headlines with news it was attaching higher prices to its bigger sizes, a policy it said it would reverse.

Adapted from: <https://www.bbc.co.uk/news/business-44451139>

Questions to consider:

1. Summarise the case study in less than 30 words.

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2. What are the key reasons why New Look is struggling in the clothing market?

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3. Do you think that New Look have made the right decision by reducing their prices to try and compete with Boohoo and PLT? Explain your answer.

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4. What else could New Look do to compete with these other businesses? (Try to think of 2/3 ways)

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STRIVE: Of the suggestions you have made in question 4, which do you think would be most effective? Explain your answer.

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Developing your business vocabulary

You are going to learn a lot of new vocabulary over the next two years, so here are the core concepts that we would like you to find out about.

Find and learn the definitions of these top business terms using the (fabulous!) website <https://www.tutor2u.net/business> , you may use examples if it helps to illustrate your point:

- Assets
- Balance sheet
- Capacity utilisation
- Demand
- Exchange rates
- Fixed costs
- Globalisation
- Horizontal integration
- Inferior goods
- Job production
- Lean production
- Market research
- Niche markets
- Penetration pricing
- Quality control
- Retained profit
- Stakeholders
- Tariffs
- Opportunity cost
- Sectors
- Unlimited liability
- Private limited company
- Dividends

Keyword	Definition
Assets	
Balance sheet	
Capacity utilisation	
Demand	
Exchange rates	
Fixed costs	
Globalisation	
Horizontal integration	
Inferior goods	
Job production	
Lean production	
Market research	
Niche markets	
Penetration pricing	

Quality control	
Retained profit	
Stakeholders	
Tariffs	
Opportunity cost	
Sectors	
Unlimited liability	
Private limited company	
Dividends	

Developing your analysis and evaluation skills

Analysis and evaluation are two key assessment objectives that you will be tested on during your T Level. You will need to prepare a presentation (with no more than 10 slides) which answers questions below; we expect you to do some research and use real life business scenarios to support your arguments.

Remember that the slideshow does not need to contain all your argument - only key points, which you could elaborate on if you are asked about it. There is no 'right' answer to the statements we have used; we are just trying to get you thinking about the topics you will be studying.

Theme One Topic

“The best way to increase profit is to advertise”

Discuss the extent to which this statement is true, showing a balanced argument and an overall conclusion.

Suggested points:

- - What is profit?
- - What are the ways which a business can improve profit (including advertisement)?
- - What evidence have you gathered to support your argument?
- - What evidence could be used against your argument?
- - Give an overall conclusion about what you think based on your evidence.

OR

Theme Two Topic

“I don't need a plan, I've got a great business idea, I'm just going to run with it”

Discuss the extent to which you agree with the above statement showing a balanced argument and an overall conclusion.

Suggested points:

- - What is business planning?
- - Why is it important / unimportant to have a plan?
- - Could you realistically create a business without a plan? How do you know? What evidence do you have?
- - Give an overall conclusion about what you think based on your evidence.