Wood Green Academy
AND SIXTH FORM CENTRE

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Headteacher: Mr J.Topham B.Sc.(Hons), M.Sc., NPQH

HOW TO PREPARE FOR A LEVEL COMPUTER SCIENCE

A-level Computer Science is a challenging A-level and is split into 3 units.

Unit 1 Computer Systems- in-depth knowledge of the computer system,

Unit 2 Algorithms and Programming- advanced programming skills and techniques in Java

Unit 3 Programming Project- coursework unit where you develop your own project

To prepare for this A-level complete the tasks below to give you a head-start and a clear understanding of the expectations of this qualification

Challenge 1 – *Unit 1 Computer Systems (Input, Output, Storage and System Software)*

For the following tasks you are expected to complete at least 1 A4 page for each term / category:

a) Research Input, Process and Output, giving a definition and purpose of each. Following this, research the different types of Input and Output devices, 3 different types of storage device, "RAM" and "ROM" and "Virtual Storage". For each one you need to:

- Explain the term and its purpose in a computer system
- Explain (in detail) where it is found in a computer system
- Explain the advantages and disadvantages of each (including comparison)
- Use appropriate images to support your research

b) Research Application and System Software, giving a definition of each, and the difference between their purposes. Following this, research the system software "BIOS", "Device Drivers" and "Virtual Machines". For each one you need to:

- Explain the term and its purpose in a computer system
- Explain where it is used in a computer system, with real examples
- Explain the advantages to a computer system of using it / disadvantages without it
- Use appropriate images to support your research

EXTENSION: Continue to research system software, such as operating systems, different types of scheduling and interrupts

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Challenge 2 – *Unit 1 Computer Systems (CPU and Processing)*

For the following tasks you are expected to complete at least 1 A4 page for each term / category:

a) Research the term "CPU", giving a definition and purpose. Following this, research the 5 registers and 3 buses in CPU, the FDE cycle and 3 factors affecting performance of the CPU. For each one:

- Explain the term(s) and the purpose in a computer system
- Explain the benefits of using it in a computer system / disadvantages without it
- Explain the movement of data through the processor elements mentioned (with examples)
- Use appropriate images to support your research

b) Research and explain the key terms "RISC" and CISC", "Multicore systems", and "CPU" and "GPU" For each one you need to:

- Explain each term and its purpose in a computer system
- Explain the advantages to a computer system of using it / disadvantages without it
- Compare the 2 terms and the similarities and differences between them
- Use appropriate images to support your research

EXTENSION: Continue to research the operation of processors, such as Assembly language programs (little man computing), Pipeline processing and Von Neumann / Harvard architecture

Challenge 3 – *Unit 2 Algorithms and Programming (Programming Techniques)*

For the following tasks practicing writing program code AND pseudocode:

a) Create an account on snakify.org and add your teacher as timothy.anstey@woodgreenacademy.co.uk
Learn and complete the problems about python 3 programming language; the more you complete the better. Your progress will be tracked by your teacher

b) Create a free account on codeacademy.com. Go to "Catalog" and select "Java" as the programming language, to help you find the "Learn Java" course. Enrol on this and work through the chapters 1-6, completing all the exercises. You will not be directly tested on chapter 3 or 5, as long as you have a basic understanding of them. The content across all other chapters (up to 6) requires a good knowledge.

EXTENSION: Continue to practice java techniques to develop your skills and improve your knowledge

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Challenge 4 – *Unit 2 Algorithms and Programming (Sorting and Searching Algorithms)*

For the following tasks you are expected to complete at least 1 A4 page per algorithm:

a) Create an Review/revision booklet on different Searching Algorithms (Linear Search, Binary Search), this must contain the following:

- Explanation on how each algorithm works
- Example of how each algorithm works
- Explain the advantages and disadvantages of each algorithm (including comparisons)
- Useful images where appropriate

b) Create an Review/revision booklet on different Sorting Algorithms (Bubble Sort, Insertion Sort, Merge Sort, Quick Sort), this must contain the following:

- Explanation on how each algorithm works
- Example of how each algorithm works
- Explain the advantages and disadvantages of each algorithm (including comparisons)
- Useful images where appropriate

EXTENSION: For each algorithm explain/comment the pseudocode/program code to complete them

School Email for Lead Subject Teacher: timothy.anstey@woodgreenacademy.co.uk