SAFFRON WALDEN
COUNTY HIGH SCHOOL

SWCHS SIXTH FORM SUMMER WORK

A Level Computer Science

TASK

Programming and other daily Challenges

If you have any queries regarding this work please email mlaight@swchs.net

Task

Please complete as many of the daily challenges listed further below as you can. This covers a breadth of topics, they are all short activities which will help to extend your current knowledge. You do not need to complete all of them however we expect you to complete ONE of the below options and bring the code with you to our first lesson. Spend your time on Option 1 **or** Option 2 first so you can see how long you have spent, then do a selection of the daily challenges.

OPTION 1

Write a program to:

Ask the user to input
Their first name
Their surname
A date, in the format DD/MM/YYYY
The program should then output a customer ID as follows:

The date in the format YYYYMMDD, then the first three letters of the surname, then the first initial, then the length of their first name. All letters should be in capitals – For example, John Smith, 27/05/2017 would give 20170527SMITHJ4

The program should validate any inputs and keep asking for inputs until the user enters correct details or types "quit" at any point

OPTION 2

Write a program to:

Analyse a passage of text from a file and then counts:
How many words are in the file
The average length of the words in that file
How many times each word occurs in that file
How many words start with each letter of the alphabet?
What are the most commonly used words in the file?

You could test your program using text that you copy from sections of online books and paste into a txt file.

How will this work be used in lessons?

This will give us some indication of the programming skills that you are currently at so we know the level that we can start teaching for each class.

How long will this task take?

3-4 hours max

A month of Computer Science

Download a copy of this document. You will need to update the table at the end as you complete the challenges. Might be worth highlighting or changing the text colour as you complete them so you know which ones you have completed.

Your challenge is to complete as many tasks as you can to develop your knowledge of Computer Science, develop your skills, and open your eyes to the wider topics surrounding our amazing subject.

Please bring a copy of this document to your first lesson or email it to **mlaight@swchs.net** once you have completed all tasks.

Challenge 1  Find and read a recent news article relating to cybercrime. Paste the link in the table at the end of this document.	**Challenge 2** Watch this video: https://www.youtube.com/watch?v=J0FhV3dM80o Summarise 2 concepts covered in the video.	**Challenge 3**  See if you can complete the Nerdle. https://nerdlegame.com/	**Challenge 4** Go on amazon and have a look for a book which you think would be suitable to expand your knowledge of a computer science topic. Put the link in the table below. (You do not need to buy the book!) Explain why you think it would be good.
Challenge 5  Click on https://learningcontent.cisco.com/games/binary/index.html Write down the rules for converting binary to denary, and denary to binary.	**Challenge 6** Watch this: https://www.youtube.com/watch?v=ad79nYk2keg Summarise what AI is in the table below.	**Challenge 7**  Research some methods of social engineering. Summarise them in bullet points in the below table.	**Challenge 8**  Computational art: https://news.mit.edu/2022/chelsi-cocking-art-computation-0626 Read the article and write a short paragraph in the comments box about which subject you link closely to computer science and why
Challenge 9 Complete the C# certificate at https://www.hackerrank.com/skills-verification/c_sharp_basic	**Challenge 10**  Check out some university degrees in the area of Computer Science. What specific courses may interest you? What extra-curricular activities could you do?	**Challenge 11**  Read the article: https://news.mit.edu/2022/side-channel-attacks-detection-0609 Bullet point 3 takeaways in the comments box.	**Challenge 12**  Download a copy of the C# Yellow Book: https://static1.squarespace.com/static/5019271be4b0807297e8f404/t/5df9306ec60881645ea57ced/1576611956760/CSharp+Book+2019+Refresh.pdf and work through the first chapter.

Challenge 13  Research a job in a specific area of Computer Science. What qualifications do you need? What are the most important skills required for the job?	**Challenge 14**  Sign up and complete some of the problem solving tasks at https://www.hackerrank.com/domains/algorithms?filters%5Bdifficulty%5D%5B%5D=easy	**Challenge 15**  Watch this short video: https://www.youtube.com/watch?v=6-JjHa-qLPk Write 3 bullet points covering the main topics	**Challenge 16**  Read "2022 10 break through technologies": https://bit.ly/3u6qXqA Note down the 3 you are most interested in.
Challenge 17  Watch the video; https://www.youtube.com/watch?v=4l8RSQ4c79Y Drone warfare – list some moral/ethical points surrounding the topic.	**Challenge 18**  Research sizes of secondary storage. What has happened over the last 10 years?	**Challenge 19**  Read this article: https://www.proclinical.com/blogs/2022-4/top-10-new-medical-technologies-2022 Pick one area and summarise your thoughts on it in 3 bullet points	**Challenge 20**  Watch the video: https://www.youtube.com/watch?v=I-EIVlHvHRM
Challenge 21  What is the difference between storage and memory?	**Challenge 22**  Complete some logic problems: http://www.mrbartonmaths.com/puzzles/	**Challenge 23**  Research a controversial topic relating to advancements in technology. Make a case for it, and against it.	**Challenge** 24  Download and install Visual Studio Community https://visualstudio.microsoft.com/vs/community/ You will be using this to code in.
Challenge 25  Research about cores and make some notes. What are they? What impact do they have on the running of the PC?	**Challenge 26**  Coding with music: https://sonic-pi.net/ Listen to some of the video clips. If this inspires you download sonic pi and see what you can do!	**Challenge 27**  Watch a tech-based film or series. Summarise the tech involved and your thoughts on the movie/series.	**Challenge 28**  Write down the principles of operation of a hard disk drive. Do this from memory. Make 6 bullet points.

Keep a log of how you get on and log any useful links that you find.

Date	Task	Comments/Notes