A LEVEL

H446

COMPUTER SCIENCE

Code Challenges (21 – 40)

September 2015
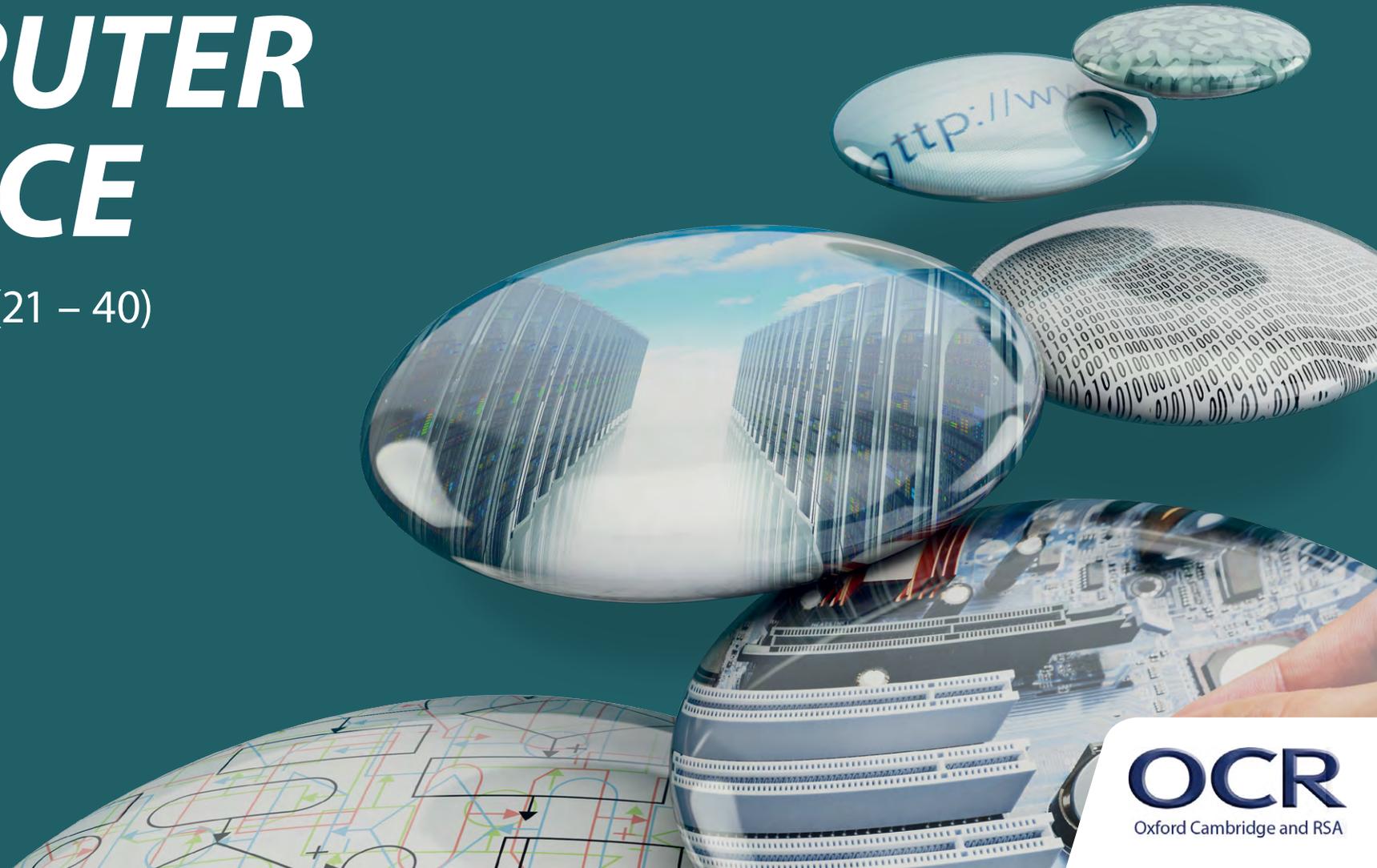
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21	**Data Entry**
	Create a program that retrieves the membership details for a Rock Climbing Club. The program should take a range of details and then repeat them back, with headings, for confirmation. Once confirmed, the program stores these details; else it clears them and allows a new input.
	Extensions:
	1. Allow entry of more than one membership
	2. Store membership details to a file
	3. Retrieve details from a file
	4. Allow searching for stored users
22	**Simple Life Calculator**
	Create a program that has 3 simple calculators within it, e.g. VAT, Tax and Times table. Allow users to choose which calculator they want to use and then carry out that calculation.
	Extensions:
	1. Use a an option menu so that the user can use more than one calculation before the program closes
23	**Fibbing**
	Create a program that will calculate the Fibonacci Sequence to 10 places.
	Extensions:
	1. Allow the user to specify the number of places generated
	2. Print this in reverse order
	3. Display the total of all the numbers shown

24	**Hack-proof**
	Create a program that will only open a text document if the correct password is entered. The user should choose the username and password first and it should also verify the password before allowing it.
	Extensions:
	1. Create a random password first of at least 8 characters first as a suggested password
	2. Create a random password that contains at least a lowercase, uppercase and special character of at least 8 characters in length
	3. Verify that the password given by the user matches:
	a. The limits in Extension 1 above
	b. The limits in Extension 2 above
25	**Ordering**
	Create a program that allows entry of 10 numbers and then sorts them into ascending or descending order, based on user input.
	Extension:
	1. The user can input a word or string, and it arranges the string into alphabetical order. E.g. My Rabbit would be shown as "abbimty ". (Punctuation placement is not essential)
	2. Repeat Extension 1, but include the sentence structure
26	**Truth or not**
	Create a program that would take the number of inputs in a logic circuit and works out the number of output lines are needed for the truth table. Have it draw the truth table on screen, using Columns for Inputs (A, B, C etc) and rows for the 1's and 0's.
	Extension:
	1. Fill in the rest of the truth table if you can!
27	**Word Subtraction**
	Create a program that takes two strings/words. Then then converts this to an ASCII value and subtracts the values from each other.
	Extension:
	1. Also add a function that removes any characters in the second word that occur in the first word. E.g. Fish and Tin, would return "Fsh" and "Tn"

28	**Name that Number**
	Telephone Keypads often have letters associated with each number. This means that 0141 117 2556 could be stored as 0141-CAT-DOOR. Create a program that can convert a phone number with "letters" into one that only contains digits.
	Extensions:
	1. Can you develop your program so that only words in the dictionary are allowed?
29	**Item Merge**
	Create a program that will compare two shopping lists from "Week A" and "Week B". It will return any unique items contained on the list.
	Extension:
	1. Append the two lists, with no repetition
	2. Develop this to 4 Weeks of shopping an highlight the top 3 most popular items
30	**Year Addition**
	Create a program that accepts a year in the format ####, e.g. 2015. The program then adds each digit of the year together and outputs the answer. E.g. 2015 becomes the output 8.
	Extension:
	1. Develop this so that the user can guess an integer value. If the MOD division is "0" they score a point, if it isn't they can guess again, up to 3 attempts in total
31	**Forwards and Backwards**
	Create a program that is able to detect if an input is the same as the reverse of the same input – i.e. a Palindrome
32	**Code it up**
	Create a program that adds 25 to the value of each character of a string that a user enters. This new string should be saved and output.
	Extension:
	1. Develop your program to include a conversion from a 'coded' string back to a normal string
	2. Develop your program to allow the user to enter the number they want the string coded by (e.g. 12)
	3. Develop your program to then decode a string, based on the coded value that the end user enters

33	**Mor-se Coding**
	Create a program that allows you to enter a string and encode it into Morse code, using '.' and '-' notation. Spaces between words should be replaced with the "|" (pipe) character. Use a normal space for gaps between each character.
	Extension:
	1. Develop your program to translate from Morse to alphanumeric, using the standards above
34	**What's the day?**
	Design a program to take 3 inputs, one for day, one for month and one for year. Get your program to validate if this is an actual day, and, if it is, output the day of the week it is!
	Hint: How do leap years affect this program?
35	**Game of Chance**
	A user can bet on any number from 0 to 30. If it's an even number they 2x their money back. If it's a multiple of 10 they get 3x their money back. If it's a prime number they get 5x their money back. If the number is below 5 they get a 2x bonus.
	Create a program that allows the user to guess a number. A random number is generated. If the guess == the random number then the user wins and gets a pay-out. Combinations of the win scenarios should be catered for.. e.g. 20 wins 2 x 3 bonus = 6x their money.
	Extension:
	1. Develop your program to allow a user to enter the amount they want to place for that bet, and work out the resulting pay-out
	2. Develop your program to store the user's current balance and stop them from betting if they have no money left
	3. Develop your program to finally incorporate validation so that they cannot enter into a negative about of cash ever, and that a bet should be between 1 and 10 units of currency
	4. Develop your program to allow multiple bets on different numbers
36	**Triangulate**
	Create a program that accepts 3 sides of a triangle. It then works out if these sides form a triangle, and if so, what type of triangle (e.g. Scalene, Isosceles, Right-Angle….)
	Extension:
	1. Develop your program to allow 2 sides of a triangle and an angle, to work out the length of the missing side

37	**Fizz Buzz**
	
	Create a program that replicates the famous game Fizz Buzz. The program will take an input, e.g. 20, and then print out the list of Fizz Buzz up to and including that number, where:
	
	• Any multiple of 3 is replaced by the word 'Fizz'
	
	• Any multiple of 5 is replaced by the word 'Buzz'
	
	• Any multiple of both 3 and 5 is replaced by the word 'FizzBuzz'
	
	Extension:
	
	1. Replace any prime number with the word 'OOPS!'
	
	2. Allow the user to enter the base numbers that they want to replace words with. E.g. 2 and 3, which would mean:
	
	    • Any multiple of 2 is replaced by the word 'Fizz'
	
	    • Any multiple of 3 is replaced by the word 'Buzz'
	
	    • Any multiple of both 2 and 3 is replaced by the word 'FizzBuzz'

38	**Sing Along** Create a program that prints the lyrics to the song '10 green bottles' in as few lines of code as possible. **Extension:** 1. Develop this program so that you can enter any starting number and it will count down from there
39	**Even more Odd** Create a program that accepts and random integer array (at least 10 integers) and orders them firstly by size, (small to large), and then puts all the even numbers AFTER the odd numbers within the array. It then echos the original array and the modified array to screen. E.g. an array 1,2,3,4,5,6,7,8,9,10 would be output 1,3,5,7,9,2,4,6,8,10. **Extension:** 1. Develop your program to allow Character input as well, and these come before the integers, and are listed in reverse alphabetical order
40	**Base of Numbers** Create a program that converts a denary number into its hexadecimal equivalent. **Extension:** 1. Allow the user to specify the base that they want to convert the number into, using an integer, e.g. 16 for Hexadecimal

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