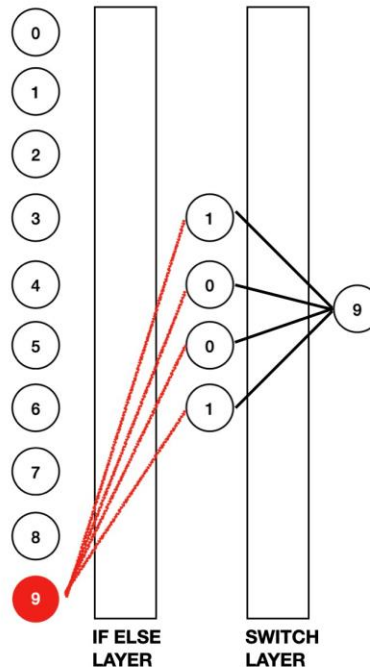


Programming Fundamentals

Question 1:

You will design the architecture below



Each Circle represents a variable that will be flagged as true or false. You have to ask the user to flag which variable as true and others will be marked as false. Then you have to convert the variable index 0 - 9 into its binary and mark the layer2 variables with the binary number layer2 will have 4 Circles meaning four variables. The Above example shows that 9 is marked so the binary of 9 is 1001 so level2 variables 1 and 4 are marked as 1 and variables 2 and 3 will be marked as 0. Then you have to use the switches to implement which variables in Layer2 are True and False to mark layer3's only variable with the value of index variable turned on.

Question 2:

You have to implement the following pattern you have to use for the loop, if else for this you cannot hardcode. You will also ask the users for scale factor to actually scale the pattern you will take values from 1 to 2. 1 is the same pattern and 1.5 is 50% larger and wider pattern and 2 meaning double the pattern size. Make sure you implement all the checks in your code. Your code must be generic.

Name	Qty	Total
.....
.....
.....
.....
.....
.....
.....
.....
Total Qty	
Total Amount	
GST	
Total	

Question 4:

You have to write a c++ code to convert decimal to hexadecimal and octal.

You are only allowed to use ternary operators no if and else or switches.

Decimal = 20

Hexadecimal = 14

Octal = 24

Question 5:

You have to write a c++ code to take a string and find all possible subwords in a sentence either in reverse or normal way also you have to tell the number of words, number of special characters, and number of characters in the sentence.

Sentence = This is a good assignment everyone can do this good assignment siht.

Subword = This

Number of time sub word found = 3

Number of words = 12

Number of Characters = 68

Number of special characters = 1

Question 6:

You have to write code to make a pattern as below and you have to take input from the user for the maximum number to be in the pattern and the number of diamonds.

Number of Diamonds = 2

Largest number = 5

```

    11      11
  2112    2112
321123  321123
43211234 43211234
54321123455432112345
43211234 43211234
321123  321123
  2112    2112
    11      11
```

Question 7:

In this, you will implement encryption of a sentence/word of x length and encrypt it by using the following algorithm. (Length of sentence/word must be not greater than 6). You must take the input from the user and take the input until a correct 6 or fewer characters are entered.

Let x be the length of a sentence that you have to take from a user. After taking the sentence you have to encrypt the sentence. You will encrypt the sentence with each character's ASCII and store it in a **datatype other than a string or a char**. Each ASCII will be separated by your roll number iteratively. For Example: **Let's say the Roll no of the Student is 1765** Roll no will be in String.

S U P E R _

Will be encrypted as:

83 1 85 7 80 6 69 5 82 1 95

Question 8:

Now you have to implement decryption of the upper algorithm and separate the roll number separators and the ASCII. Finally, you have to convert the ASCII back into the word or sentence and store it in a string. You must take the Encrypted key from the user and it must not be a string or a char. You must show the word or sentence and the roll number separators. For Example:

83 1 85 7 80 6 69 5 82 1 95

Will be decrypted as:

S U P E R _

And you will also show the roll number which is

1765

Goodluck 🤪