***Practice Questions***

* ***Objective Questions:-***

1. Which of the following is invalid in c?

* int a; b=a;
* int v=3^3;
* char dt= '21 Dec 2020' ;

1. What data type will 3.0/8 – 2 return?
2. 3.0+1 will be:

* Integer
* Floating number
* Character

1. What will be the output of this program?

int a=10;

if(a=11)

printf(“I am 11”);

else

printf(“I am not 11”);

1. A do-while loop is executed:

* At least once
* At least twice
* At most once

1. What can be done using one type of loop can also be done using the other two types of loops – True or False.
2. What will the following line produce in a C program: printf(“%d %d %d\n”,a,++a,a++);
3. If S[3] is a 1-D array of integers, then \*(S+3) refers to the third element:
   * True
   * False
   * Depends
4. Which of the following is used to appropriately read a multi-word string-

* Gets()
* Puts()
* Printf()
* Scanf()

1. Twenty integers are to be stored in memory. What will you prefer- Array or Structure?

* ***Subjective Questions:-***

1. Write a c program to calculate the area of a rectangle:
   1. using hardcoded inputs &
   2. using inputs supplied by the user
2. Calculate the area of a circle and modify the same program to calculate the volume of a cylinder given its radius and height.
3. Write a program to convert Celsius (Centigrade degrees temperature to Fahrenheit)
4. Write a program to calculate simple interest for a set of values representing principle, no of years, and rate of interest.
5. Write a program to check whether a number is divisible 97 or not.
6. Explain step by step evaluation of 3\*x/y-z +k. Where x=2, y=3, z=3 and k=1
7. Write a program to find out whether a student is pass or fail; if it requires a total of 40% and at least 33% in each subject to pass. Assume 3 subjects and take marks as input from the user.
8. Calculate income tax paid by an employee to the government as per the slabs mentioned below:

Income Slab Tax

1. 2.5L-5.0L 5%
2. 5.0L-10.0L 20%
3. Above 10.0L 30%

Note that there is no tax below 2.5L. Take income amount as an input from the user.

1. Write a program to find whether a year entered by the user is a leap year or not. Take the year as input from the user.
2. Write a program to determine whether a character entered by the user is lowercase or not.
3. Write a program to find the greatest of four numbers entered by the user.
4. Write a program to print the multiplication table of a given number n.
5. Write a program to print a multiplication table of 10 in reversed order.
6. Write a program to sum the first ten natural numbers using a while loop.
7. Write a program to implement program 16 using for and do-while loop.
8. Write a program to calculate the sum of the numbers occurring in the multiplication table of n.(Consider 8x1 to 8x10)
9. Write a program to calculate the factorial of a given number using for loop.
10. Repeat 17 using a while loop.
11. Write a program to check whether a given number is prime or not using loops.
12. Implement 19 using other types of loops.
13. Write a program using functions to find the average of three numbers.
14. Write a function to convert Celcius temperature into Fahrenheit.
15. Write a function to calculate the force of attraction on a body of mass m exerted by earth. (g=9.8m/S2)
16. Write a program using recursion to calculate the nth element of the Fibonacci series.
17. Write a recursive function to calculate the sum of first n natural numbers.
18. Write a program using functions to print the following pattern(first n lines):

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1. Write a program to print the address of a variable. Use this address to get the value of this variable.
2. Write a program having a variable i. Print the address of i. Pass this variable to a function and print its address. Are these addresses same? Why?
3. Write a program to change the value of a variable to ten times its current value. Write a function and pass the value by reference.
4. Write a program using a function that calculates the sum and average of two numbers. Use pointers and print the values of sum and average in main().
5. Write a program to print the value of a variable i by using the "pointer to pointer" type of variable.
6. Try problem 31 using call by value and verify that it doesn’t change the value of the said variable.
7. Create an array of 10 numbers. Verify using pointer arithmetic that (ptr+2) points to the third element where ptr is a pointer pointing to the first element of the array.
8. Write a program to create an array of 10 integers and store a multiplication table of 5 in it.
9. Repeat problem 36 for a general input provided by the user using scanf()
10. Write a program containing a function that reverses the array passed to it.
11. Write a program containing functions that counts the number of positive integers in an array.
12. Create an array of size 3x10 containing multiplication tables of the numbers 2,7 and 9, respectively.
13. Repeat problem 40 for a custom input given by the user.
14. Create a three-dimensional array and print the address of its elements in increasing order.
15. Write a program to take a string as an input from the user using %c and %s. Confirm that the strings are equal.
16. Write your own version of strlen function from <string.h>
17. Write a function slice() to slice a string. It should change the original string such that it is now the sliced strings. Take m and n as the start and ending position for slice.
18. Write your own version of strcpy function from <string.h>

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1. Write a program to encrypt a string by adding 1 to the ASCII value of its characters.
2. Write a program to decrypt the string encrypted using the encrypt function in problem 47.
3. Write a program to count the occurrence of a given character in a string.
4. Write a program to check whether a given character is present in a string or not.
5. Create a two-dimensional vector using structures in C.
6. Write a function SumVector which returns the sum of two vectors passed to it. The vectors must be two-dimensional.
7. Write a program to illustrate the use of an arrow operator -> in C.
8. Write a program with a structure representing a Complex number.
9. Create an array of 5 complex numbers created in problem 5 and display them with the help of a display function. The values must be taken as an input from the user.
10. Write problem 54s structure using typedef keyword.
11. Create a structure representing a bank account of a customer. What fields did you use and why?
12. Write a structure capable of storing date. Write a function to compare those dates.
13. Solve problem 58 for time using typedef keyword.
14. Write a program to read three integers from a file.
15. Write a program to generate a multiplication table of a given number in text format. Make sure that the file is readable and well-formatted.
16. Write a program to read a text file character by character and write its content twice in a separate file.
17. Take name and salary of two employees as input from the user and write them to a text file in the following format:

name1, 3300

name2, 7700

1. Write a program to modify a file containing an integer to double its value.
2. If old value = 2, then new file value = 4
3. Write a program to dynamically create an array of size 6 capable of storing 6 integers.
4. Use the array in Problem 66 to store 6 integers entered by the user.
5. Solve problem 66 using calloc().
6. Create an array dynamically capable of storing 5 integers. Now use realloc so that it can now store 10 integers.
7. Create an array of the multiplication table of 7 up to 10 (7x10=70). Use realloc to make it store 15 numbers(from 7x1 to 7x15).
8. Attempt problem 69 using calloc().

* Project 1: Number Guessing Game

**Problem:** This is going to be fun!!  We will write a program that generates a random number and asks the player to guess it. If the player’s guess is higher than the actual number, the program displays “Lower number please.” Similarly, if the user’s guess is too low, the program prints “Higher number please.”

When the user guesses the correct number, the program displays the number of guesses the player used to arrive at the number.

**Hints:**

* Use loops
* Use a random number generator.

**Code:**

#include<stdio.h>

#include<stdlib.h>

#include<time.h>

int main(){

int number, guess, nguesses=1;

srand(time(0));

number = rand()%100 + 1; // Generates a random number between 1 and 100

// printf("The number is %d\n", number);

// Keep running the loop until the number is guessed

do{

printf("Guess the number between 1 to 100\n");

scanf("%d", &guess);

if(guess>number){

printf("Lower number please!\n");

}

else if(guess<number){

printf("Higher number please!\n");

}

else{

printf("You guessed it in %d attempts\n", nguesses);

}

nguesses++;

}while(guess!=number);

return 0;

}

* Project 2: Snake, Water, Gun

**Snake, Water, Gun** or **Rock, Paper, Scissors** is a game most of us have played during school time. (I sometimes play it even now :) )

Write a C program capable of playing this game with you.

Your program should be able to print the result after you choose Snake/Water or Gun.

**Code:**

#include<stdio.h>

#include<stdlib.h>

#include<time.h>

int snakeWaterGun(char you, char comp){

// returns 1 if you win, -1 if you lose and 0 if draw

// Condition for draw

// Cases covered:

// ss

// gg

// ww

if(you == comp){

return 0;

}

// Non-draw conditions

// Cases covered:

// sg

// gs

// sw

// ws

// gw

// wg

if(you=='s' && comp=='g'){

return -1;

}

else if(you=='g' && comp=='s'){

return 1;

}

if(you=='s' && comp=='w'){

return 1;

}

else if(you=='w' && comp=='s'){

return -1;

}

if(you=='g' && comp=='w'){

return -1;

}

else if(you=='w' && comp=='g'){

return 1;

}

}

int main(){

char you, comp;

srand(time(0));

int number = rand()%100 + 1;

if(number<33){

comp = 's';

}

else if(number>33 && number<66){

comp='w';

}

else{

comp='g';

}

printf("Enter 's' for snake, 'w' for water and 'g' for gun\n");

scanf("%c", &you);

int result = snakeWaterGun(you, comp);

if(result ==0){

printf("Game draw!\n");

}

else if(result==1){

printf("You win!\n");

}

else{

printf("You Lose!\n");

}

printf("You chose %c and computer chose %c. ", you, comp);

return 0;

}