

End Sem Practice Questions

Q.1.The user inputs an integer n. We need to make evenly spaced square grid of nxn.

```
#include<simplecpp>
main_program
{
    turtleSim();
    int n;
    cout<<"Enter size of grid";
    cin>>n;
    right(180);
    repeat(____a____)
    {
        ____b____(90);
        penUp();
        forward(20);
        left(90);
        penDown();
        forward(____c____);
        right(180);
        forward(____c____);
    }
    right(90);
    repeat(n+1)
    {
        forward(____c____);
        right(180);
        forward(____c____);
        left(90);
        penUp();
        forward(20);
        ____d____(90);
        penDown();
    }
    wait(20);
}
```

Q.2. We need to write a C++ program to give the user the choice to select between 3 mathematical series:

- a) Geometric ($1/1 + 1/2 + 1/4 + 1/8.....$)
- b) Harmonic ($1/1 + 1/2 + 1/3 + 1/4.....$)
- c) Alternating ($1/1 - 1/2 + 1/3 - 1/4.....$)

```
#include<simplecpp>
main_program
{
    cout<<"Enter 1 for geometric, 2 for harmonic, 3 for alternating";
    int choice, ans=0, n, i;
    cin>>choice;
    cout<<"Enter number of terms";
    cin>>n;
    if (choice!=1 && choice!=2 && choice!=3)
        cout<<"wrong input";
    else
    {
        if(choice==____a____)
        {
            for(i=1;i<=n;i++)
            {
                if(i%2==0)
                    ans=____d____;
                else
                    ans=____e____;
            }
        }
        if(choice==____b____)
        {
            int j=____f____;
            for(i=1;i<=n;i++)
            {
                ans=ans+(1/j*2);
                j=____g____;
            }
        }
        if(choice==____c____)
        {
```

```

        for(i=1;i<=n;i++)
            ans=ans+(1/_____h_____);
    }
}

```

Q.3 Choose most appropriate option

```

#include <iostream>
using namespace std;

int main( )
{
    char x ;
    for ( x = 0 ; x <= 253 ; x++ )
        cout <<"Ascii value:" << (int)x << "Character:" << x << endl;
}

```

the above program

- a. compilation error
- b. indefinite loop
- c. prints 0 to 255 ascii value and corresponding character
- d. run time error

Q.4 fill the expression for total = _____ ?

/* getMissingNo takes array and size of array as arguments and return the single element which is missing from the continuous series*/

```

#include<iostream>
using namespace std;
int getMissingNo (int a[], int n)
{
    int i, total;
    total = _____
    for ( i = 0; i < n; i++)
        total -= a[i];
    return total;
}

```

```

int main()
{
    int a[] = {1,2,4,5,6};
    int miss = getMissingNo(a,5);
    cout <<miss;
    return 0;
}

```

output of this program is 3

Q.5 The function given takes a binary number as input and computes its decimal value. Complete the function.

```

int binary2decimal (string bin)
{
    int i,dec=0;
    for(i=0;i<bin.lenght();i++)
        dec = dec + _____;
    return dec;
}

```

Q.6 Find the output

```

#include <iostream>
using namespace std;
int main ()
{
    int firstvalue = 20, second = 10;
    int *p1, *p2;
    p1 = &first; p2 = &second;
    *p1 = 10;
    *p2 = *p1;
    p1 = p2;
    *p1 = 20;
    cout << first <<endl;
    cout<< second << endl;
    return 0;
}

```

Q.7 what is the output (CSE)

```
#include<iostream>
using namespace std;
int main()
{
    int arr[2][2] = {1, 2, 3, 4};
    int i, j;
    int *ptr[] = {(int*)arr, (int*)arr+1, (int*)arr+2};
    for(i=0; i<2; i++)
    {
        for(j=0; j<2; j++)
        {
            cout << (*(ptr+i))+j<<" "<< *(j+ptr)+i<<" "<< *(i+ptr)+j<<" "<< *(ptr+j)+i
            << endl;
        }
    }
    return 0;
}
```

Q.8 Find the output

```
#include<iostream>
using namespace std;
int fun(int x, int y)
{
    if(y == 0)
        return 0;
    if(y > 0 )
        return (x + fun(x, y-1));
    if(y < 0 )
        return -fun(x, y+15);
}
int main()
{
    cout<< fun(10, -20);
    return 0;
}
```

Q.9 (CSE)

Give a vector of vectors (of integers) A, we want to sort each row(vector) of A.

i.e. for

A[0] = 3 6 5

A[1] = 3 4 7 6

A[2] = 0 1

we want the answer as

A[0] = 3 5 6

A[1] = 3 4 6 7

A[2] = 0 1

One easy way of doing so is to take each vector in A and sort them individually.

But suppose you are given an additional information that each integer in A lies in range [0, A.size()). How can you use this additional information to your advantage?

Of course, you can still use the previous method to sort each vector in A individually. But, there exists a method which does less computation and doesn't make use of any sorting function.

Fill in the blanks(with exactly one command each) to complete the following function. At the end of this function, A should have all its rows(vectors) sorted.

You aren't allowed to use any built-in C++ sorting function.

(Hint: Make use of the additional information that you have)

```
void sort(vector< vector<int> >& A){
    vector< vector<int> > B(A.size()), C(A.size());

    for(int i=0; i<A.size(); i++)
        for(int j=0; j<A[i].size(); j++)
            _____1_____

    for(int i=0; i<B.size(); i++)
        for(int j=0; j<B[i].size(); j++)
            _____2_____

    A = C;
}
```

Q.10 What is the value of calc after calling f(9) ?

```
int calc=0;           //global variable
void f(int n)
{
    if(n%3==1) calc++;
    if(n<3) return;
    f(n-1);
    f(n-2);
    f(n-3);
}
```

Q.11 Find the output

```
#include <iostream>
using namespace std;
void swap(char *x, char *y)
{
    char temp;
    temp = *x;
    *x = *y;
    *y = temp;
}
void fun_call(char *a, int l, int r)
{
    int i;
    if (l == r)

        cout <<a<<endl;
    else
    {
        for (i = l; i <= r; i++)
        {
            swap((a+l), (a+i));
            fun_call(a, l+1, r);
            swap((a+l), (a+i));
        }
    }
}
```

```

}
int main()
{
    char str[] = "ABC";
    char *cp=str;
    int n=0;
    while (*cp++ !='\0' )
        n++;
    fun_call(str, 0, n-1);
    return 0;
}

```

Q.12 Complete the binary search function

```

int binary_search (int arr[], int lo, int hi, int elem)
{
    if(lo>hi) return -1;
    int mid=____a____;
    if(elem<arr[mid])
        return binary_search(arr,____b____,____c____,elem);
    else if(elem>arr[mid])
        return binary_search(arr,____d____,____e____,elem);
    else return mid;
}

```

Q.13 (CSE) We want to write a function which computes the determinant of a square matrix. Matrix is stored in the form of vectors. Complete the following fill in the blanks so that our function returns the desired determinant value

```

int det(vector< vector<int> >& A){
    if(____1____)
        return A[0][0];
    int ans = 0;
    for(int i=0; i<A.size(); i++){
        vector< vector<int> > B;
        for(int r=0; r<A.size(); r++){
            if(____2____){
                vector<int> temp(____3____, ____4____);

```

```

        B.push_back(temp);
    }
}
int m = (i%2)?-1:1;
ans += A[i][0] * ____5____;
}
return ans;
}

```

Q.14 (CSE) The following function when given a string, finds the rank of the string among all its permutations sorted lexicographically. For example, rank of “abc” is 1, rank of “acb” is 2, and rank of “cba” is 6.

Lexicographic Order: abc,acb,bac,bca,cab,cba

```

int findRank (char* str)
{
    int len = strlen(str);    //This function returns the length of any string
    int mul = fact(len);      //This function returns the factorial of the input
    int rank = 1;
    int countRight;
    int i;
    for (i = 0; i < len; ++i)
    {
        mul /= len - i;
        // The following function counts the number of chars smaller than str[i]
        // from str[i+1] to str[len-1]
        countRight = findSmallerInRight(str, i, len-1);
        rank =rank + ____a____;          (3 marks)
    }
    return rank;
}

```

Fill in the blanks in the function definition of findSmallerInRight

```

int findSmallerInRight(____b____, ____c____, ____d____ )
{
    int countRight = 0, i;
    for (i = low+1; i <= high; ++i)
        if (str[i] _____ < str[low])
            ++countRight;
    return countRight;
}

```

Q.15 What is the output of the following program?

(Hint:

In C++, a Copy Constructor is called in following cases:

1. When an object of the class is returned by value.
2. When an object of the class is passed (to a function) by value as an argument.
3. When an object is constructed based on another object of the same class.)

```
#include <iostream>
using namespace std;
struct gov{
    gov(){
        cout << "inside constructor 1" << endl;
    }
    gov(int x){
        cout << "inside constructor 2" << endl;
    }
    gov(const gov &a){
        cout << "inside copy constructor" << endl;
    }

    void operator=(const gov &a){
        cout << "inside assignment operator" << endl;
    }
    gov func1(gov &a){
        return a;
    }
    gov func2(gov a){
        return a;
    }
    gov& func3(gov a){
        return *this;
    }
    gov& func4(gov &a){
        return a;
    }
};

int main(){
    cout << "Block-1 : " << endl;
    gov a, b;
    a = b;
    b = gov(a);
    cout << endl;
    cout << "Block-2 : " << endl;
```

```

gov *c = new gov[2];
gov *d = new gov(2);
gov *e;
e = c;
e = new gov(*c);
cout << endl;
cout << "Block-3 : " << endl;
gov f = a.func1(b);
f = a.func2(b);
f = a.func3(b);
f = a.func4(b);
}

```

Q.16 Fill in the blanks

```

#include<iostream>
using namespace std;
class Test
{
private:
    int x;
public:
    void setX (int x) { _____ = x; }
    void print() { cout << "x = " << x << endl; }
};
int main()
{
    Test obj;
    int x = 40;
    obj.setX(x);
    obj.print();
    return 0;
}

```

if output is :

x = 40

Choose most appropriate option

- a. Test :: x
- b. this -> x
- c. either a or b
- d. none of these

Q.17 Write a program asking user to input the number of seconds after midnight and then display the time in hours:minutes:seconds e.g., 06:34:05 (note the placement of zero when the number is less than 10).

The declaration of the Time class is given below:

```
class Time{
    public:
        Time(long n_sec);
        int get_hours() const;
        int get_minutes() const;
        int get_seconds() const;
    private:
        long n_sec;
        int hours, minutes, seconds;
};
```

Write the definitions of the 4 functions shown in the above declaration. Also complete the program to print the desired output.