Q1 WAP to read inputs (int, float, double, char, char[], string) from a keyboard and display the output in the monitor using I/O streams.

THEORY

The keyword cin is a stream object, predefined in C++ to correspond to the standard input stream. This stream represents data coming from the keyboard.

The keyword cout is a predefined stream object that represents the standard output stream in C++. A stream is an abstraction that refers to a flow of data.

PROGRAM

```
#include <iostream>
#include <string>
using namespace std;
int main()
{
  string str1;
  char str[20];
  int a;
  float b;
  double c;
  char d;
  cout<<" Enter an integer: "<<endl;
  cin>>a;
  cout<<" Enter a floating number: "<<endl;
  cin>>b;
  cout<<" Enter a double number: "<<endl;
  cin>>c;
  cout<<"Enter a character: "<<endl;
  cin>>d;
  cout<<"Enter a string: "<<endl;
  cin.get(str, 20);
  cout<<" Enter any string: "<<endl;
  getline(cin, str1);
  cout<<a<<" "<<b<<" "<<c<<" "<<d<<" "<<str<<" "
     <<str1<<endl;
  return 0;
}
```

OUTPUT

```
Enter an integer: 5
Enter a floating number: 5.1
Enter a double number: 5.2
Enter a character: a
Enter a string: Avi
Enter any string: Avi Yadav
```

OUTPUT

```
5 5.1 5.2 a Avi Avi Yadav
```

Q2. Implement a macro in c++ called "SQUARE" that takes an argument and returns the square of that number. Use macro expansion technique to compute the square value without using any built in mathematical functions.

THEORY

⇒ It is a process where an identifier in a program is replaced by a predefined string composed of one or more tokens. This process performs the task under the direction of #define statement.

PROGRAM

```
#include <iostream>
#define SQUARE(a) (a*a) // macros
using namespace std;
int main()
{
   int n;
   cout<<"Enter any number:"<<endl;
   cin>>n;
   cout<<"The square of "<<n<<" is "<<SQUARE(n)<<endl;
   return 0;
}
```

OUTPUT

```
Enter any number: 3
The square of 3 is 9.
```

Q3. Implement a c++ program that demonstrates the usage of namespaces. Create three namespaces called "English", "Nepali" and "Newa". All namespaces should define a function called "greet" that takes no parameters and returns a greeting message in the respective language. In the main function, invoke the "greet" function from each namespace and display the greetings.

THEORY

A namespace is a feature that allows us to group related code and definitions together and prevent naming conflict. Its syntax is given by :-

```
namespace namespace_name
  {
    // Declaration of variables, functions, class etc.
  }
```

PROGRAM

```
#include <iostream>
using namespace std;
namespace English
    {
      void greet()
          {
           cout << "Hello!" <<endl;
          }
    }
namespace Nepali
      {
       void greet()
           {
            cout << "Namaste!"<<endl;
           }
      }
namespace Newa
    {
     void greet()
      {
       cout << "Jwa Thalpa " <<endl;
      }
    }
```

```
int main()
{
  English :: greet();
  Nepali :: greet();
  Newa :: greet();
  return 0;
}
```

OUTPUT

```
Hello!
Namaste!
Jwa Jhalpa
```

Q4. WAP to implement endl, setw, setprecesion, fixed, scientific Manipulator.

THEORY

Manipulators are instructions to the output stream that modify the output in various ways. It is defined in <iomanip> header file.

PROGRAM

```
#include <iostream>
#include <iomanip>
using namespace std;
int main()
{
 double n;
 char str[40];
 cout << " Enter any string :" <<endl;
 cin>> str;
 cout << " Enter any floating number :" <<endl;
 cin>> n;
 cout << setw(8) << str << endl;
 cout << setprecesion(5) << n << endl;
 cout << fixed << n << endl;
 cout << scientific << n << endl;
return 0;
}
```

OUTPUT

```
Enter any string : Abhishek↵
Enter any Floating number : 1432.078 ↵

Abhishek
1432.1
1432.078000
1.43208e+03
```

Q5. WAP to ~~find~~ implement dynamic memory allocation with new and delete operators (for both simple variable and array variable).

THEORY

When the amount of memory to be allocated is not known beforehand and the required memory is allocated during runtime (when the program is actually executing) is ~~reffe~~ referred to as dynamic memory allocation.

⇒ The operator new allocates the memory dynamically and returns a pointer storing the memory address of the allocated memory.

⇒ The operator delete deallocates pointed by the given pointer.

PROGRAM

```
#include <iostream>
using namespace std;
int main()
{
  int *p;
  p = new int;
  cout << "Enter any value:" << endl;
  cin >>*p;
  cout << "The address of the pointer is " << p << endl;
  cout << "The value entered is " << *p << endl;
  delete p;

  int *ptr;
  ptr = new int[5] {1,2,3,4,5};
  for(int i=0;i<5;i++)
    {
```

```
cout << ptr[i] << "  ";
delete ptr
return 0;
}
```

OUTPUT

```
Enter any value : 10 ↵
The address of the pointer is 0x1c1730.
The value entered is 10.
1 2 3 4 5
```

Q6. WAP to find the volume of a cube, cuboid and cylinder using the concept of function overloading.

THEORY

More than one functions having the same name but differs either in number of arguments or type arguments or both is said to be function overloading.

PROGRAM

```
#include <iostream>
using namespace std;
int main ()
{ void vol (int a)
        {
          cout << "The volume of the cube is " << a*a*a << endl;
          return 0;
        }
  void vol (int a, int b, int c)
      {
        cout << "The volume of the cuboid is " << a*b*c << endl;
      }
  void vol (int *a, int b)
      { float pi = 3.14;
        cout << "The volume of the cylinder is " << pi*a*a*b << endl;
      }
```

```
int main()
{
    int a, b, c, r, d, h;
    cout << " Enter length of a cube: " <<endl;
    cin >> a;
    cout << " Enter length of sides of cuboid and height : "<<endl;
    cin >> b >> c >> d;
    cout << " Enter the radius and height of the cylinder: "<<
                                                        endl;
    cin >> r >> h;
    vol ( a);
    vol ( b,c,d);
    vol (r, h);
  return 0;
}
```

OUTPUT

```
Enter length of a cube : 10 ↵
Enter length of sides of cuboid and height : 10 ↵ 5 ↵ 2 ↵
Enter the radius and height of the cylinder : 7 ↵ 1 ↵

The volume of the cube is 1000.
The volume of the cuboid is 100.
The volume of the cylinder is 21.980000.
```

Q7 WAP to swap values of two integers, two characters, two floats and two strings respectively using function overloading.

PROGRAM

```
#include <iostream>
using namespace std;
v
```