Lab 2
Review

1. I/O
2. Data type and variables
3. if statement
4. while statement
5. for loop
6. Functions (recursive functions)
7. Arrays
8. Strings
9. Files
I/O

• “cin” for input
  - ex: cin>>a;

• “cout” for output
  - ex: cout<<a;
Data type and variables

- Variable: Allows storage of data internally for the program
- Data type: int, double, char, bool, string
If statement

```java
if (boolean_value_condition_check) {
    body statement if the condition is true
    ...
}
else
    if (check_here_if_the_first_condition_is_false)
        body statement if this condition is true
    else
        body statement -
        if non of the previous condition is true
```
While statement

Model:

while (repeat_when_condition_is_true)
    { body statement .... }  

Example:

int i = 0;
while (i++ < 10)
cout << i;
int i = 0;
while (i < 10)
cout << i;
For loop

Model:

\[
\text{for( initialize; comparison; update) }
\{
    \text{statement;}
\}
\]

Example:

\[
\text{for( int c = 1 ; c <= 10 ; ++c )}
\{
    \text{//do some thing here 10 times}
\}
\]
Functions

• A group of code that carries a single task

• A big task may break into several smaller tasks

• May be called from another function

• Example:

```cpp
int main() {
    int n = getNumber();
    return 0;
}
```

```cpp
int getNumber() {
    int num;
    cout << "Enter a number:"
    cin >> num;
    return num;
}
```
Recursive functions

• A function that calls itself to finish a repeated task

• Ask itself to do a smaller portion of the task (recursive call)

• Finish the task base on the result of the smaller portion (iterative step)

• Includes a situation when the task is a single process that cannot be
  break down as repeated task (base case)

• Example:

```c
void printArray(int a[], int size){
    if (size == 0) return;
    printArray(a, size – 1);
    cout << a[size – 1];
}
```
Arrays

- a collection of data
- same data type
- size of the collection
- index of the entry
2D Array

- a collection of data
- data type is an array
- usually visualize it as a table
- with row and column index
String

• String is a class build into the C++ library.

• It is there to place the original “cstrings” concept first developed for C.

• String has predefined functions contained within the class which we can use for our convenience to do string manipulations.

• Example:

  string firstname="Guozhen";

  string lastname= "An";
File

- IOSTREAM
- OFSTREAM
- IFSTREAM
- EOF