

## Part 4: For Loop

**For:** Runs a loop until a condition becomes true. I.E counting the number of times through a loop and exiting the loop once a counter gets to a certain value.

**While:** Runs a loop as long as a certain condition is true.

We will add a for loop in this program to have a person enter 4 numbers and find the average. 1<sup>st</sup> we need to make 4 new variables

1. counter
2. average
3. number
4. total

Note the use of a comma next to the age variable. We can add, next to a variable to add more variable names on a single line. This helps reduce the length of the code. We also have to declare a value for the counter. We will make the average, total, and number a real number which is declared as double type of variable so the program can output a Real Value (value with decimals).

Comments (`//` or `/*...*/`) allows user to add explanation to lines of code or remove code from being compiled. This makes it easier for programmers to remove code without deleting; in case the programmer wants to use it later.

This tutorial will comment out the Age and If/Else statements

```
#include <iostream>

using namespace std;

int main()
{
string firstname;

// int age;                                /** Add the comment syntax shown in bold

double average=0, number=0, sum=0;        // double allows user to create Real Numbers (numbers with decimals)
                                           // variable average used to calculate average of numbers to be added
                                           // variable number is for the user to enter a number to be added
                                           // variable sum used to total up the numbers added

cout << "Hello World\n";
cout << "What is your name?";

cin >> firstname;

cout << "Hello " << firstname << " my name is PC\n";

/* CODE FOR ASKING YOUR AGE HERE                                /** Add the comment syntax shown in bold; Starting before
                                                                    // cout << "What is your Age?";

if (age <= 40)
{
cout <<"You are a youngster\n";
}
}
```

```

else
{
cout << "You are Over the Hill!\n";
} */
cout << "You will enter 4 numbers and we will find the average for you.\n";
for (int counter =1; counter <= 4; counter++)
{
cout << "enter #" << counter << " : ";
cin >> number;
sum = number + sum;
}
average = sum/4; //Average formula outside of for loop since it only
// needs to be calculated once
cout << "The summation of numbers entered is: " << sum << "\n";
cout << "The average of your numbers is:" << average << "\n";
return 0;
}

```

## Save File Assignment

Add/Modify the following in the code above

- Declare a variable that is an integer named usernumber
- Modify the question before the for loop asking the following
  - o How many numbers to add?
  - o Take in the input using the variable usernumber
- Change the for loop to the following
  - o for (int counter=1; counter <= usernumber; counter++)
- Change the formula average to average = sum/usernumber;
- Add a question and variable
  - o Question: Are you averaging Grades? (y for yes; n for no)
  - o Input: variable type string named grade
- Add If/else statement
  - o If Yes grades are being averaged setup if statements that will output below
    - Average < 60
      - Output = Need to work harder
    - 60 <= Average <= 75
      - Output = Good
    - 75 <= Average <= 90
      - Output = Excellent
    - Average >90
      - Output = Top of the Class
  - o Else
    - Output = Hope you get the answer you wanted.

Run the Program and Troubleshoot

## Part 5: Do/While Loop

Do/While and While loops allows the user to continue a loop as long as a condition is True. Often times used to ask the user if they want to continue a specific task.

Difference between Loops

- Do/While will allow the user to run the loop a minimum of 1 time and check to see if the loop will run a second time at the end of the loop

- While loops will check if the loop will be entered first. This could result depending upon the comparison statement of the loop never running if the comparison is False.

```
#include <iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
char exit; //variable exit used to end the do/while loop when the correct character is entered
```

```
string firstname;
```

```
// int age;
```

```
double average=0, number, sum;
```

```
cout << "Hello World\n";
```

```
cout << "What is your name?";
```

```
cin >> firstname;
```

```
cout << "Hello " << firstname << " my name is PC\n";
```

```
/* CODE FOR ASKING YOUR AGE HERE
```

```
if (age <= 40)
```

```
{
```

```
cout <<"You are a youngster/n";
```

```
}
```

```
else
```

```
{
```

```
cout << "You are Over the Hill!\n";
```

```
}*/
```

```

do
{
sum = 0; //resets the variable sum to 0; so it does not add the previously stored
// value of sum (i.e first time through the loop sum = 7; second time
// through the loop sum will start back at 0 not 7.

cout << "How many Numbers to add? ";
cin >> usernumber;

for (int counter =1; counter <= usernumber; counter++)
{
cout << "enter #" << counter << ":";

cin >> number;

sum = number + sum;
}

average = sum / usernumber;

cout << "The summation of numbers entered is: " << sum << endl;
cout << "The average of your numbers is:" << average << endl;

cout << " Press any key to continue or press x to exit";

cin >> exit;

}

while (exit!= 'x'); // Compares the input of variable a to see if the loop should continue. Loop
// will continue as long as the variable a does not equal x
// NOTE: if the user enters more than one character (i.e types exit instead of x)
// Program will either end the program or push the program into an infinite
// loop; depending on how the comparison is written.

return 0;
}

```

## Save File

### Add/Modify the Program

- Change Variable exit to a variable type of string
- In the while statement add other acceptable answers that a user may type in other than x to exit the program (i.e x, X, exit, etc.)

## Show Teacher Completed Program

## Print Screen Shot of Program