Suffix rules in Makefile

```
%.o: %.cpp %.h
    g++ -c –o $@ $<
```

- a rule that applies to all files ending in the .o suffix. The rule says that the .o file depends upon the .cpp version of the file and the .h files.
- $@ says to put the output of the compilation in the file named on the left side of the :, the $< is the first item in the dependencies list.

```
OBJ = main.o yourClass.o
a.out: $(OBJ)
    g++ -o $@ $^
```

- the special macros $@ and $^, which are the left and right sides of the :, respectively.

Useful UNIX Commands

Command	Description
man	help menu
pico	simple text editor
gcc	compiles your source code "gnu C compiler"
a.out	executes your program
ls –al	displays a long list of files "includes hidden files i.e. dot files"
pwd	prints working directory "pathname"
cd	changes directory
mkdir	creates a directory
rmdir	removes a directory
cp file1 file2	copies contents of file1 into file2
mv file1 file2	moves a file from one place to another, or change its name
rm	removes a file
more	displays a file's contents
grep	searches for a specified pattern in a file or list of files
ps	obtains the status of the active processes in the system
kill –9 pid	terminates all processes
passwd	modify a user's password
logout	terminates your session
who	display who is on the system
finger	displays the user information
date > myfile	"output redirection" saves the output of date command in myfile
cal >> myfile	"appends" calendar to myfile
cal	display a calendar and the date
wc file1	counts the number of lines, words, and characters in file1

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Homework #1 (Compute average)

- You will find a very simple program that is supposed to find the average of a set of exam scores.
- That program has many flaws, among which are that there are no checks for **invalid scores** or for **division by zero**. In addition, a user can enter **only one** set of scores; if the user wants to average several sets, the program has to be restarted again for each set.

- You are to augment the basic program by adding the following features:

1. check for scores outside the range 0-100.

HW #1 (2)

2. check for valid scores before calculating the average.
3. prompt the user for another set of scores after the average has been printed.

- In addition, you should change the way that the program determines when all scores for one set have been entered; your program should ask the user after each score has been entered whether or not there is to be another score for that set. Finally, the output from the program should include words in addition to the computed average, i.e., adding text output to the existing program – prompt for input, informative output.

```
/* Sample Program - Average
  This program computes the average of a set of non-negative integers. It has many
  deficiencies and is meant only as a simple first illustration of a C++ program.
*/

#include <iostream>
using namespace std;

main() {
  int number;                 // The number of scores read.
  int sum;                    // The summation of all the scores read.
  int grade;                  // Holds each individual score as it is read from the keyboard.
  float average;              // Holds the computed average.

  number = 0;                 // Initialize number and sum to 0 before starting.
  sum = 0;

  cin >> grade;               // Get the first user input.
```

```
// Loop as long as the input was non-negative.
  while(grade>=0) {
     sum = sum + grade;              // Add new score into sum
     number = number + 1;          //  and count one more grade

     cin >> grade;                      // Now get the next input.
  }

// When done reading scores, compute average and display.
  average = (float)sum/number;
  cout << average;

  // When done, exit the program.
  return 0;

}
```

HW #1 (3)

- Write the code to implement the new averaging program. Your task is to:
  1. Implement the program using C++. **[或是像 C 的 C++]**
  2. Download Java J2SE from
     http://java.sun.com/j2se/
     and rewrite the program in Java.
  3. Download Python 3 from
     https://www.python.org/downloads/
     and rewrite the program in Python.

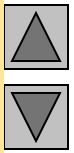
- You are required to submit a single "**makefile**" as well.

HW #1 (4)

- Learn how to set up your **debugging** environment and get experience in, for example, setting breakpoints, stepping through the execution, and evaluating a variable or an expression.

```
1  // Fig. 15.1: fig15_01.cpp
2  // Addition program
3  #include <iostream>
4
5  int main()
6  {
7     int integer1, integer2, sum;           // declaration
8
9     std::cout << "Enter first integer\n";  // prompt
10    std::cin >> integer1;                  // read an integer
11    std::cout << "Enter second integer\n"; // prompt
12    std::cin >> integer2;                  // read an integer
13    sum = integer1 + integer2;             // assignment of sum
14    std::cout << "Sum is " << sum << std::endl; // print sum
15
16    return 0;   // indicate that program ended successfully
17 }
```

```
Enter first integer
45
Enter second integer
72
Sum is 117
```



Outline

1. Load <iostream>

2. main

2.1 Initialize variables integer1, integer2, and sum

2.2 Print "Enter first integer"

2.2.1 Get input

2.3 Print "Enter second integer"

2.3.1 Get input

2.4 Add variables and put result into sum

2.5 Print "Sum is"

2.5.1 Output sum

2.6 exit (return 0)

Program Output

- The following is designed to familiarize you with the mechanics of creating, editing, compiling, and running a text-mode Java application.
- You do not have to hand it in, but you should write and run it.
- The source code in the following pages simply prompts for and accepts two numbers from the user, adds them, and displays the result.
- The file name, *Add.java* is case-sensitive and must match the class name in the program.

```
/*************************************************************
    Program to add two numbers... note that input is accepted as a
     String and then an attempt is made to convert it to a double for
     calculations. Non-numeric input is detected by the Exception
     mechanism and a default value is assigned to the value.
     *************************************************************/
import java.io.*;
import java.util.Scanner;

public class Add {
    public static void main(String args[]) {
        String amtStr;
        double num1 = 0.0, num2 = 0.0, tot = 0.0;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the first number: ");
        amtStr = sc.next();
        // try to convert amt String to double for calculation
        try {  num1 = new Double(amtStr).doubleValue();  }
        catch (NumberFormatException  e) {
            System.out.println("Bad numeric input; 1st num set to 100");
            num1 = 100; }
```

```
        System.out.println("Enter the second number: ");
        amtStr = sc.next();

        try {  num2 = new Double(amtStr).doubleValue();  }
        catch (NumberFormatException  e) {
           System.out.println("Bad numeric input; 2nd num is set to 50");
           num2 = 50; }

        tot = num1 + num2;

        System.out.println("Sum is: " + tot);

      } // end main
}    // end of class Add
```

HW #1 (5)

- The **Python** program below calculates the sum of two numbers entered by the user.

```
# Store input numbers
num1 = input('Enter first number: ')
num2 = input('Enter second number: ')

# Add two numbers
sum = float(num1) + float(num2)

# The zero argument is the name of the program file when using command line
# sum = float (sys.argv[1]) + float (sys.argv[2])

# Display the sum
print('The sum of {0} and {1} is {2}'.format(num1, num2, sum))
```

HW #1 (6)

- Output:

Enter first number: 1.5

Enter second number: 6.3

The sum of 1.5 and 6.3 is 7.8

- We use the built-in function *input()* to take the input. Since, *input()* returns a string, we convert the string into number using the *float()* function. Then, the numbers are added.

The Python Standard Library

- https://docs.python.org/2/library/

- **Hint:** use the **math.sqrt** function to compute the square root. (If you are using the Python interpreter, you need to first do **import math**)