C programming Review

Lecture 2

Introduction

- Variable
- Conditional statements
- Iteration (while, for….)

Declare Variables

- A variable is a location in memory that is most frequently referred to by its *name*, it can store a *value* of particular data_type and it has *an address and can also be referred to by its address*.

- Variable must be declared before they can be use; the format is
  - data_type variable_name; e.g. int var1

Format specifiers for printf.

- There are quite a number of format specifiers for printf. Here are the basic ones :

- %d print an int argument in decimal
- %ld print a long int argument in decimal
- %c print a character
- %s print a string
- %f print a float or double argument
- %p print the value of a pointer in its hex format
- %u print an unsigned interger (positive numbers)
-

Input/ output

- There are numerous ways to **input** data via the keyboard:
  - scanf("%d", &input) (explain this code)
  - *fgets(ArrayName, Array_Size, stdin): **gets** can cause problems*

- There are numerous was to output data (to screen):
  - printf(" the value of the input is: %d", input);
  - putchar(input);
  - puts(input);

- It is important to remember that you write a program two sets of people the **end user** and **a programmer**:
  - For an end user: "appropriate user/interface; e.g. prompt/output…." ;
  - For the programmer what is the code doing?

Conditional Statements

- A conditional statement?
  - **Relational expressions**
    - Has two parts: Operands and operator
    - 5 > 3; 5==3; 5 == 5;
    - Returns a Boolean value: true/false
  - **Boolean operators**
    - Has two parts: Operands and operator
    - The three basic operators are: AND (&&); OR (||) and NOT (!)
    - Returns a Boolean Value

Conditional Expressions

Basic Types of conditional statements:

- **If (condition 1)**{
  - Statement 1….
- }
- Statement 2

- **If (condition 2)**
- {
  - Statement 1
- }
- **else**
- {
  - Statement 2;
- }
- Statement 3;

- If condition 1 is true what is the output?
- If condition 1 is false what is the output?
- If condition 2 is true what is the output?
- If condition 2 is true what is the output?

Iteration statements

- What is the purpose of iteration statements?
- Main types of Iteration statements are:
  - *while* ; *do while* and *for* loop:
    - When should you use them?
  - Sentinal and counter control?
    - Differentiate between them.
- The **3** Important steps associated with iteration statements:
  - Initalise conditional variables,
  - write conditional expression ;
  - change a variable in the conditional expression

What is the purpose of the following code?

denis.manley@apollo: ~/OS2/week1

```c
int main()

{
        // variable declaration
        int value;

        // do while loop executed at least once

        do
        {
                printf("enter an integer between 1 and 20: ");
                scanf("%d",&value);
        }while ((value < 1) || (value > 20));

        printf("exit loop: the value entered is: %d\n", value);



        return 0;
}
```

What is the purpose of the following code?

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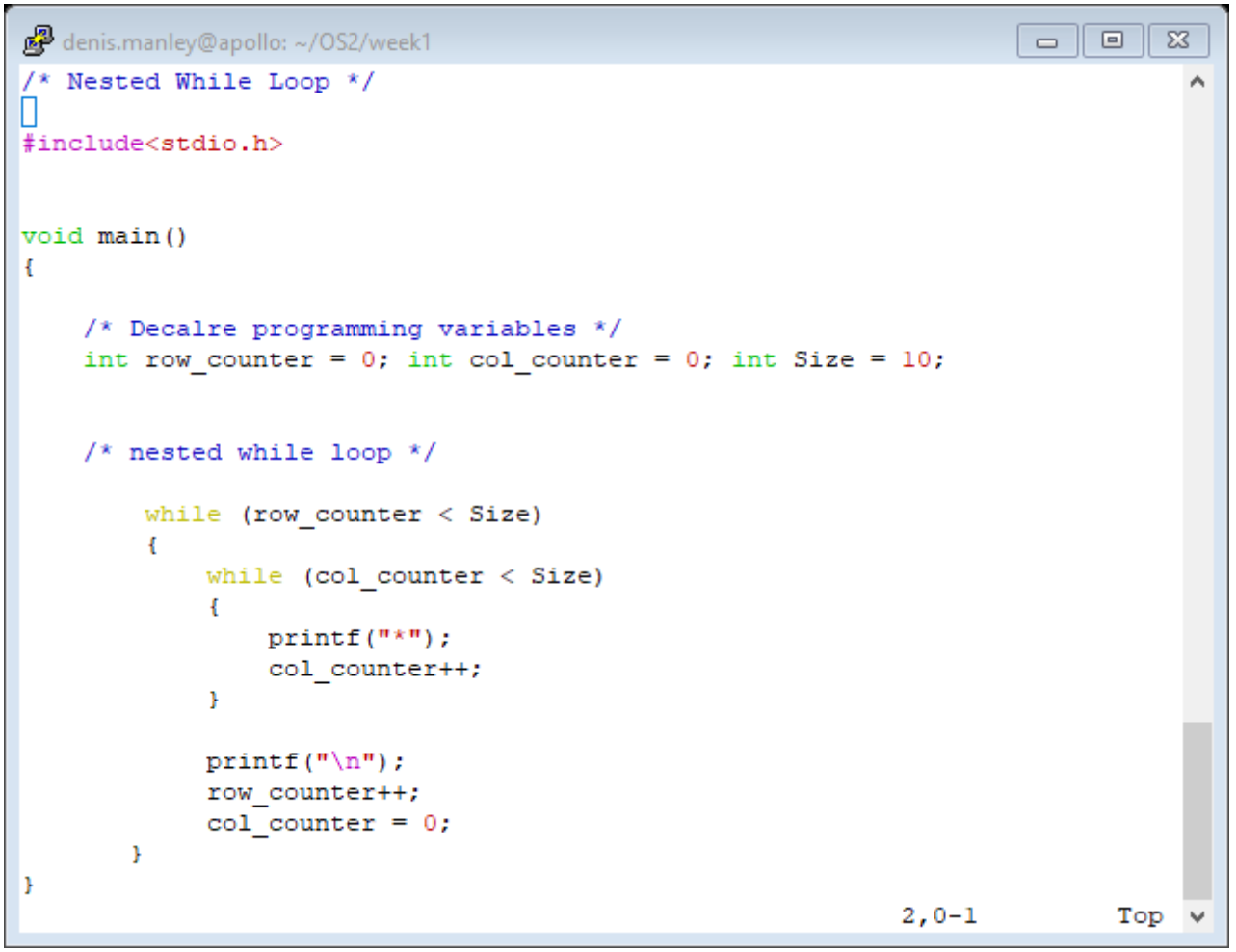
        printf("exit loop: the value entered is: %d\n", value);



        return 0;
}
```

a) What is the output of the following code?



b) What would happen to the code if col_counter = 0 is removed/commented out?

Arrays: static data structure

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```c
/* Program to determine the age of 10  people */

#include <stdio.h>

int main()
{
    int index, ages[10], total_age = 0;

        printf("please enter the ages of 10 people: ");

    for(index=0; index<10; index++)
    {
        printf(" person number %d: ", index+1);
                scanf("%d", &ages[index]);
                total_age = total_age + ages[index];
    }

        printf("The average age is: %d", total_age/10);


}
```

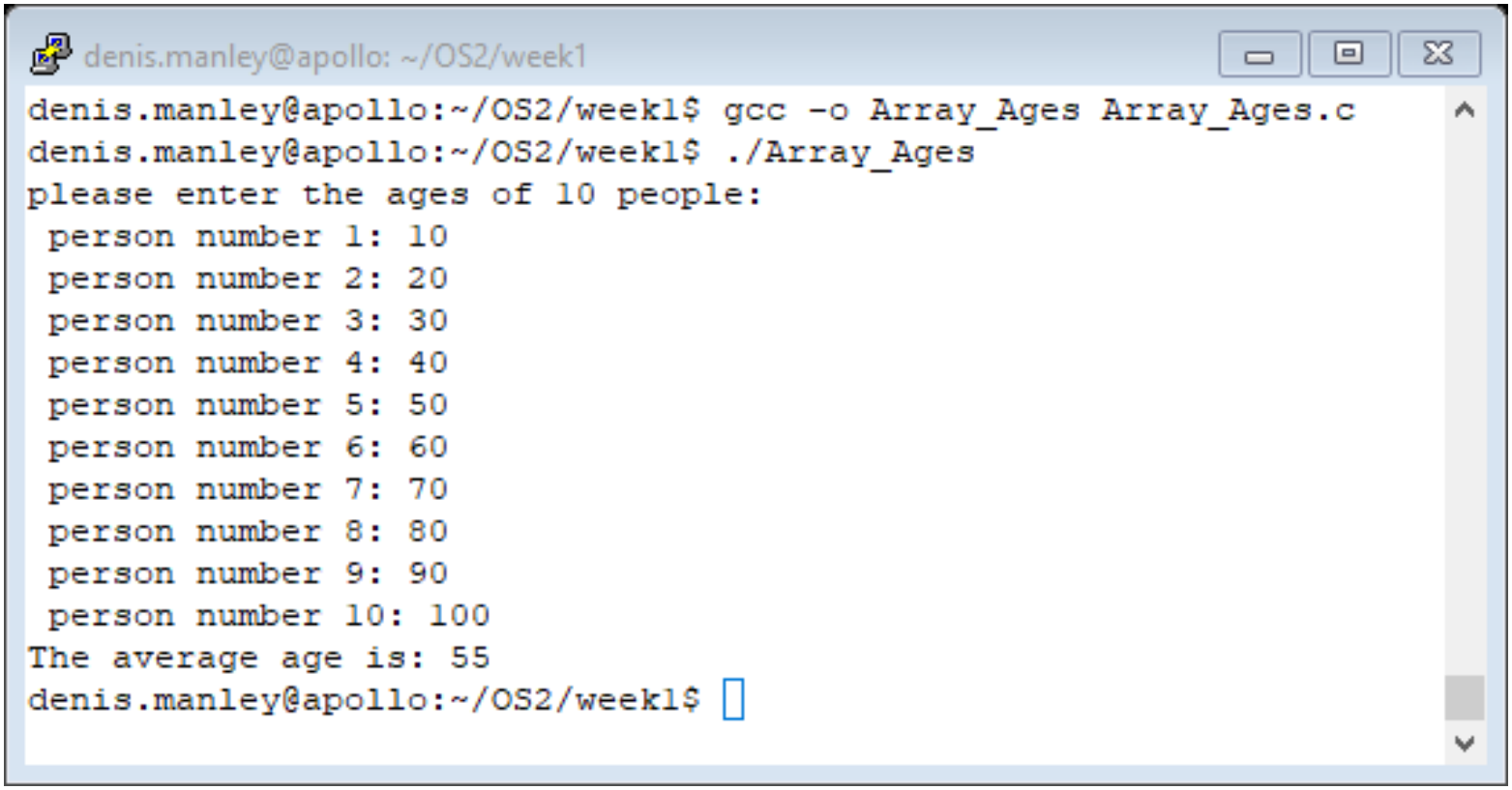
1,1 All

Compile and run a program in linux

- Use the **gcc compiler**
- To compile (go to directory where program is stored: using cd)
  - **gcc –o exe_file name c source file name**
- To run the program
  - **./exe file**

```
denis.manley@apollo:~/OS2/week1$ gcc -o DoWhile DoWhile.c
denis.manley@apollo:~/OS2/week1$ ./DoWhile
```

Array example: compile and run



Does the program produce the correct output?

Week 1 Homework: Histogram

- Write an algorithm and a c program to
- prompt the user for 10 numbers and store these in an array.
- The numbers in the array are then processed to graph the information in
- the form of a bar chart or histogram - each number is printed, and then
- a bar consisting of that many asterisks is printed beside the number .

- The following is a sample of the expected output: