ECE/CS 151
Intro to Programming I

Variables and Constants
Chap. 2.1 – 2.4
Odds & Ends

• Assignment #1 Posted
• Programming Style Guidelines
• \ to break string onto separate lines
• What if you don’t use –o when compiling
• Different ways main is written
Program Demo
```c
#include <stdio.h>

int main()
{
    /* Notice the warning and all spaces printed before world */
    printf("hello \\
            world\n");

    /* A better way to break up the line using two strings */
    printf("hello "
            "world\n");

    return 0;
}
```

"hello.c" 13L, 258C written
Data Type

• What is data?
  – Information
  – Ex: `printf(“Hello World!\n”);`
  – Simple value
    • Literals, e.g. 23, 79.5, “Hello”, etc.

• What is a data type?
  – Description of the kind of information
    • Primitive Data
    • User Created

What are you sending the function?
Primitive Types

- char, double, float, int, long, short
- Fundamental
  - **int**: whole numbers, e.g. 45, -89, 0
  - **double**: real numbers, e.g. 2.612, -30.5, 2.3e5
  - **char**: characters, e.g. ‘A’, ‘&’, ‘x’, ‘\’"
Variables

• What is a variable?
  – Memory location with name and type to store value

• What is a declaration?
  – Statement requesting variable w/ name and type
    – Examples:
      double height;
      int age;
  – Can’t Use Keywords, p. 192
Variables

• How do we get a value in the variable?
  – Assignment Statement
    int age;
    age = 20;
    Or
    int age = 20;
  – = IS NOT equal to!!!!!
    • “gets” or “is assigned”
Printing Variables

• Use printf
• Need placeholder, p.244
  – %d, %f, %c, %hd, %ld, %u, etc.
• Example:
  
  printf(“The integer value is: %d \n”, value);
Constants

• What is a constant?
• How do we declare a constant?
  – Use of a macro, `#define`
  – Placed at top of program
  – No semicolon at end
• Example:
  `#define MAX_SIZE 100`
Assignment #1 Macros

• #include <limits.h>
• Use MIN and MAX macros from header, p.257
  – INT_MAX
  – INT_MIN
  – LONG_MAX
  – LONG_MIN
  – SHRT_MAX
  – SHRT_MIN
• Remember unsigned too...
Character Program Demo
#include <stdio.h>

#define NUM_BITS_BYTE 8

int main () {
    char op; /* Declare a character variable */
    op = '0'; /* Assign character '0' to op */

    /* Print op as a character */
    printf("%c\n", op);

    /* Print op as a decimal value */
    printf("%d\n", op);

    /* Print number of bits used to store a character */
    printf("%d\n", sizeof(char) * NUM_BITS_BYTE);

    return 0;
}

"character.c" 20L, 384C
Quiz #1

• Get into groups of 4-5.
• Discuss Assignment #1.
• What do you think it means to find the range through direct computation?
  – sizeof() function
  – pow() function
    • #include <math.h>
    • Compile with -lm