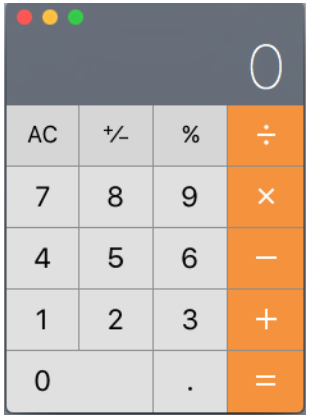
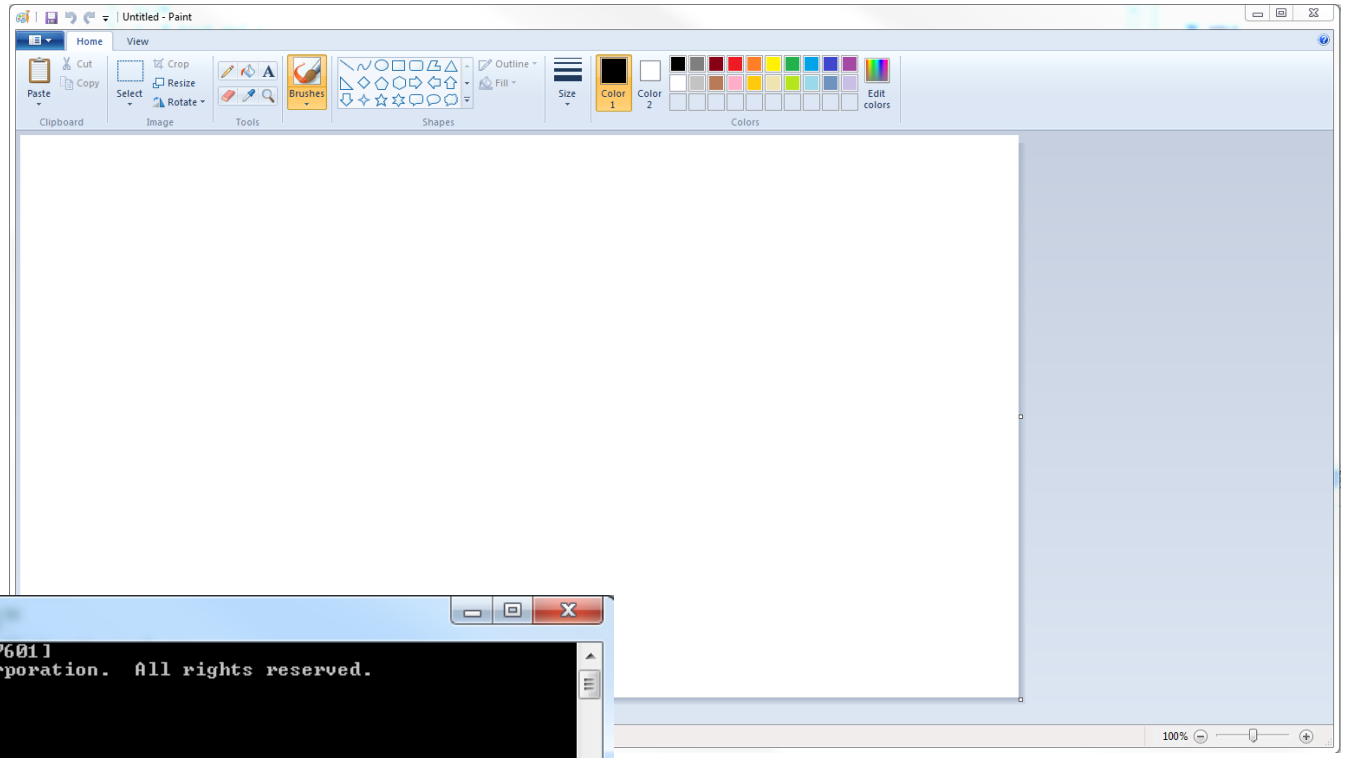
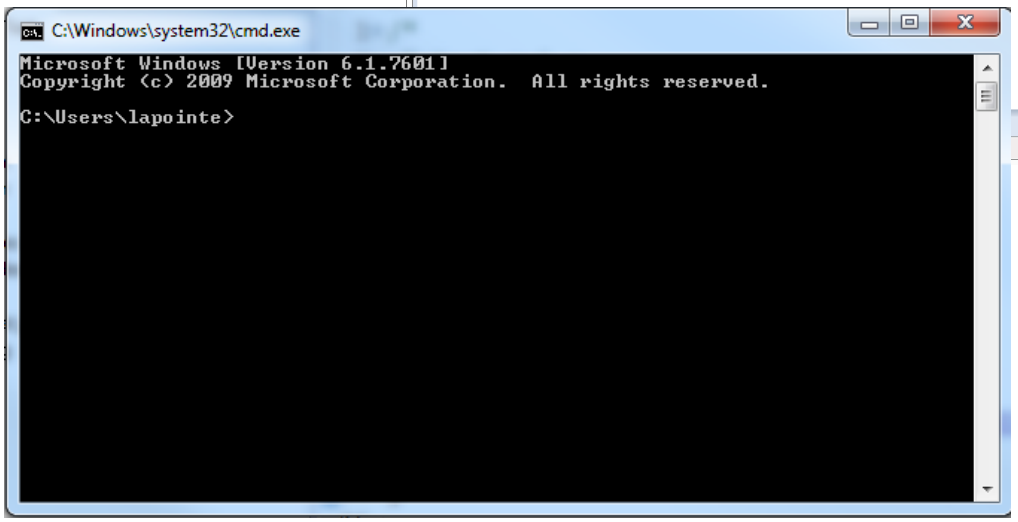
EEE243 – Applied Computer Programming

Basic Inputs and Outputs

Interaction







Some basic interactions

- Text output:
  - `printf()` function

```
printf("Hello World!");
```

- Text input:
  - scanf() function

```
scanf("%d", &num);
```

Example

```
setvbuf(stdout, NULL, _IONBF, 0);
```

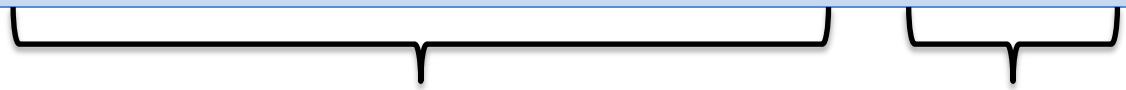
```
#include <stdio.h>

int main() {
    int num;
    while (1) {
        printf("Enter a number:\n");
        scanf("%d", &num);
        printf("You entered %d\n", num);
    }
    return 0;
}
```

Problem: In Windows, Eclipse does not display text until the user enters a value. We need to add `setvbuf(stdout, NULL, _IONBF, 0);` at the beginning of the `main`.

printf()

```
printf("You entered %d\n", num);
```



Format string

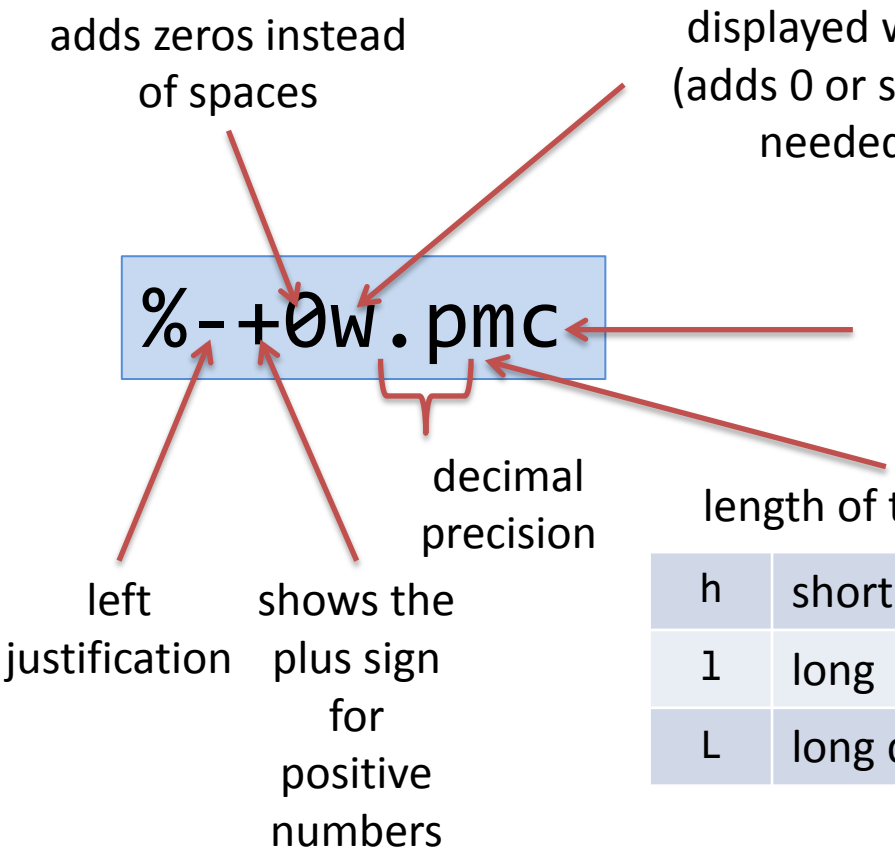
value

- literal characters (“You entered”)
- escape sequences (“\n”)
- value placeholders (“%d”)

Escape Sequences

\n	new line
\t	tab
\"	double quote "
\'	single quote '
\\	backslash \
%%	a literal % character %

Value Placeholders



length of the value

h	short
l	long
L	long double

conversion character

d, i	integer (int)
c	character (char)
f	floating point (float)
o	octal
p	pointer
s	character string
e, E	exponential
x, X	hexadecimal

Examples

```
int num = 10;
float a_float = 0.345;
```

Code	Displays
`printf("a_float is: %0.4f\n", a_float);`	a_float is: 0.3450
`printf("a_float is: %+0.4f\n", a_float);`	a_float is: +0.3450
`printf("a_float is:%05.2f\n", a_float);`	a_float is:00.34
`printf("la valeur de a_float est:%5.1f\n", a_float);`	a_float is: 0.3
`printf("a_float is %0.3f and num is %d\n", a_float, num);`	a_float is 0.345 and num is 10
`printf("num in octal: %o\n", num);`	num in octal: 12
`printf("num in hexadecimal: %#x\n", num * 4);`	num in hexadecimal: 0x28

scanf()

```
scanf("%d", &num);
```

Format string

contains only value placeholders (“%d”, “%s”)

place where to put the value

Example

```
#include <stdio.h>

int main() {
     int num;
     float a_float;

     while (1) {
          printf("Enter an integer and a float separed by a space:\n");
          scanf("%d %f", &num, &a_float);
          printf("You entered integer %d and float %0.4f\n", num, a_float);
     }
     return 0;
}
```

```
Enter an integer and a float separed by a space:
345 2.345
You entered integer 345 and float 2.3450
Enter an integer and a float separed by a space:
```

Problems

Implement the algorithms you came up with:

1. Converting temperatures in Fahrenheit to Celsius (0 C is 32 F and -40 C is -40 F)
2. Determining if a year is a leap year. Every year that is exactly divisible by four is a leap year, except for years that are exactly divisible by 100, but these centurial years are leap years if they are exactly divisible by 400.

Problem (Bonus)

3. Give the C code to find the value of a number put to a given power (x^y). Make sure you include a mechanism to ask for the values and to display the results.
4. Give the C code to compute the absolute value of a number.

Questions?