

# User Input, Input Error Checking, and Display Output

# Fundamental Input and Output

- Keyboard input
- Mouse input (e.g., click on button)
- Screen output

# User Input

User input allows the user to enter different values each time a given program is run.

For example,

Enter year of birth (yyyy): 1992

Enter month of birth (mm): 10

Enter day of month born (dd): 25

As of today you are 18 years old.

## User Input (cont.)

In programming, we would structure this as:

```
year = input('Enter year of birth (yyyy):')  
month = input('Enter month of birth (mm):')  
day = input('Enter day of month born (dd):')
```

```
yearsOld = perform appropriate calculation
```

```
print 'As of today you are', yearsOld, 'years old'
```

# User Input Error

A big part of the design and implementation of a program involves checking for user input errors.

If the input is invalid, then so is the output. This is sometimes referred to as

“Garbage in, garbage out”

## User Input Error (cont.)

What user input checking could we do for the previous example?

We can check for entered years of birth that we know cannot be correct. Obviously any year of birth that is *after* the current year cannot be correct.

We can check for entered months that are not between 1 (January) and 12 (December).

## User Input Error (cont.)

What about checking for invalid day of the month born?

If they enter a value less than 28 and greater than 31, then it must be invalid. If the entered value is between 29 and 31, it still depends on the particular month whether the day is valid or not.

Jan, March, May, July, August, October, December all have 31 days. The rest have 30 days, except for February. It has either 28 or 29 days, depending if the year is a leap year or not.

Therefore, for this program, the error checking takes some work to validate the input.

# How to Handle Invalid Input?

In the simplest cases, if an input error can be determined at the time that it is entered by the user, then one option is to simply prompt the user to re-enter.

Enter year of birth (yyyy): 2092

\*\* INVALID VALUE – PLEASE RE-ENTER \*\*

Enter year of birth (yyyy): 1992

Enter month of birth (mm): 10

Enter day of month born (dd): 25

As of today you are 18 years old.

In programming, we would structure this as:

```
currentYear = get from computer system  
currentMonth = get from computer system  
currentDay = get from computer system
```

```
leapYear = calc if year a leap year (assigned a True or False value)
```

```
year = input('Enter year of birth (yyyy):')  
while year > currentYear  
    year = input('Enter year of birth (yyyy):')
```

```
month = input('Enter month of birth (mm):')  
while month < 1 and month > 12  
    month = input('Enter month of birth (mm):')
```

```
day = input('Enter day of month born (dd):')  
while (day < 1 or day > 31) or (month == 2 and leapYear and day > 29) or  
    (month == 2 and day > 28)  
    day = input('Enter day of month born (dd):')
```

```
yearsOld = perform appropriate calculation
```

```
print 'As of today you are', yearsOld, 'years old'
```