ECS 10

11/29

Graphics Revisited

gr.text("Go Aggies", 200,150,size=20)

Go Aggies

(200,150)

Revisiting Graphics

- Animation loop:
  
  ```python
  alive = True
  while alive:
    alive = gr.sleep(.5)
  ```

The gr.sleep() function

- Pauses our program for number of seconds in argument.
- Gives user a chance to kill the graphics window
- Returns True if graphics window is still alive, False if it has been killed.

The Bigger Picture

- Multiple programs are usually running at once on your computer (Word, Firefox, music…).
- Really only one program is being executed at a time; the others are all paused.
- The processor on your computer is the part that is executing the program at any given time.
- That's why you care how fast your processor is.

Operating System

- The main job of the operating system (OS) is deciding which program gets executed at any given moment.
- OS calls programs, like our programs call functions.
- Other jobs: receive and handle keyboard or mouse input, display windows, handle desktop icons, decide what to read into memory off the disk…
Multi-tasking

- OS gives the illusion that multiple programs are running at once by taking turns running each one (like you with your classes).
- It takes a while to switch back and forth – put stuff away, get stuff out (like you with your books).

Processor Idle Loop

- Fortunately, most processes are usually paused, waiting for something before it can continue. So the OS usually has as much time to spend on any program as the program needs.
- “System Idle Process” is the program in the Windows OS which sits around waiting for something interesting to happen.

Infinite Loops

- If your program goes into an infinite loop, it does not pause and wait, constantly demands attention.
- OS stops it now and then to handle necessary business, but always gives control back to your program.
- Your machine does not lock up, but slows way down.

Our Animation Loop

```python
alive = True
while alive:
    alive = gr.sleep(.5)
```

- The `gr.sleep()` function is where we pause and let other programs run.
- Well, actually, we call the function in ecs10graphics07.py, which pauses.

Pausing for Input

- Another place we pause:
  ```python
  raw_input("Enter a name: ")
  ```
- We call `raw_input()` function of Python.
- Python asks OS to report keystrokes, pauses until OS comes back with a character.
- Python collects characters in a string, until it sees '\n', then returns the string to our program.
- Similar pauses for reading files, internet access…
Graphics Window
- Graphics window is actually it's own program, started by our program.
- Our calls to graphics functions send messages to the graphics program.
- Graphics window usually only runs when our program tells it to…which it does in gr.sleep() function.
- Our program and graphics program explicitly take turns running.

Closing the Graphics Window
- OS handles buttons and mouse actions.
- When graphics program is running, user clicks window’s kill button.
- OS tells graphics program, which (as soon as it can run) kills the graphics window, and sends message to our program.
- Our program is in gr.sleep() function, gets message, and returns False to our program.

Getting Stuck
- If our program crashes, we never allow the graphics program to run.
- It fails to respond to window closing.
- OS and user have to take charge.

Series of Windows
- Our program should put up a series of graphics windows, each with its own animation loop and chance to die gracefully, leaving the program to continue…..