

Asteroids Physics Part Dos

This time, without the "oops"



Space Ship Properties

- Should have
 - a position (ULX, ULY) - [decimal]
 - a width and height
 - an x and y velocity (decimal)
 - an acceleration/declaration rate
 - ship angle (radians)
 - turning?
 - accelerating? decelerating?



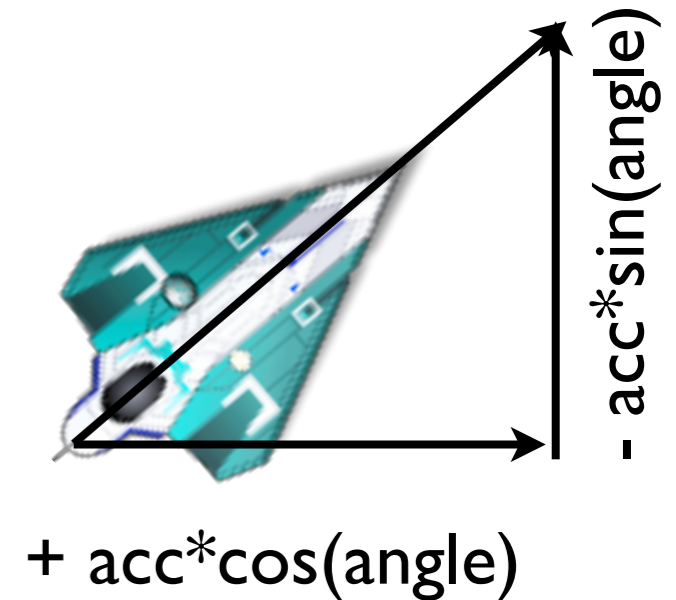
Space Ship Movement

- When a key is pressed
 - The ship **DOES NOT MOVE**
 - Only sets a variable that keeps track of the fact that it should move or rotate when update is called.



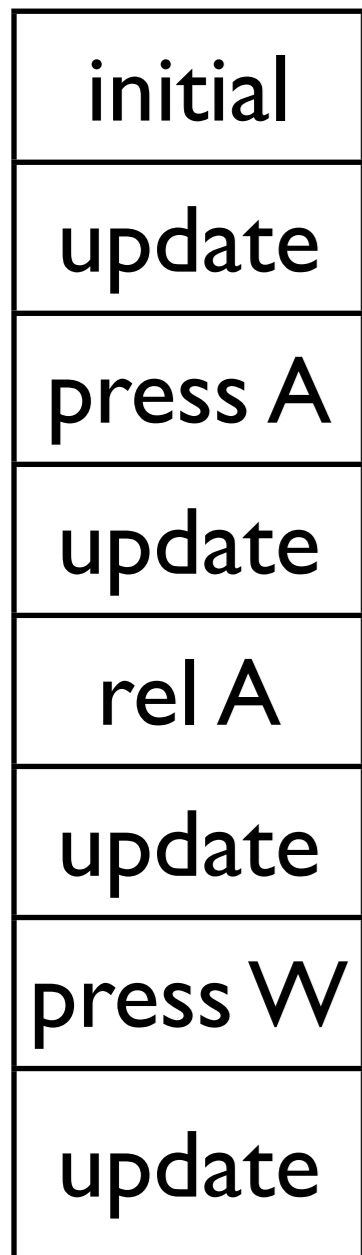
Space Ship Movement

- In update...
 - The xvelocity is added to the x-position
 - The yvelocity is added to the y-position
 - The angle is changed if turning left or right
 - The xvelocity and y-velocity are increased by the amounts in the picture IF the ship is accelerating (or decelerating) and the angle is the angle the ship is **pointing**, not the angle by which the ship is actually **moving**.



Events and Info

acc_rate: 0.01
dec_rate: 0.005



Events and Info

acc_rate: 0.01
dec_rate: 0.005

ulx	uly	xv	yv	ang
-----	-----	----	----	-----

initial
update
press A
update
rel A
update
press W
update



Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
initial	50	60	0	0	0

update
press A
update
rel A
update
press W
update



Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
initial	50	60	0	0	0
update	$+= 0$ 50	$+= 0$ 60	0	0	0

initial
update
press A
update
rel A
update
press W
update



Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
initial	50	60	0	0	0
update	$+= 0$ 50	$+= 0$ 60	0	0	0
press A	50	60	0	0	0
update					
rel A					
update					
press W					
update					

←
←
↑
↑

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang	
initial	50	60	0	0	0	
update	$+= 0$ 50	$+= 0$ 60	0	0	0	
press A	50	60	0	0	0	←
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1	←
rel A						
update						
press W						↑
update						↑

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang	
initial	50	60	0	0	0	
update	$+= 0$ 50	$+= 0$ 60	0	0	0	
press A	50	60	0	0	0	←
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1	←
rel A	50	60	0	0	0.1	
update						
press W						↑
update						↑

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang	
initial	50	60	0	0	0	
update	$+= 0$ 50	$+= 0$ 60	0	0	0	
press A	50	60	0	0	0	←
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1	←
rel A	50	60	0	0	0.1	
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1	
press W						↑
update						↑

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang	
initial	50	60	0	0	0	
update	$+= 0$ 50	$+= 0$ 60	0	0	0	
press A	50	60	0	0	0	←
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1	←
rel A	50	60	0	0	0.1	
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1	
press W	50	60	0	0	0.1	↑
update						↑

Events and Info

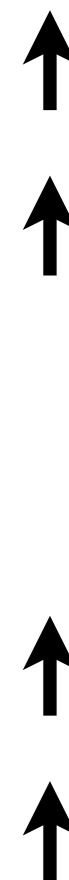
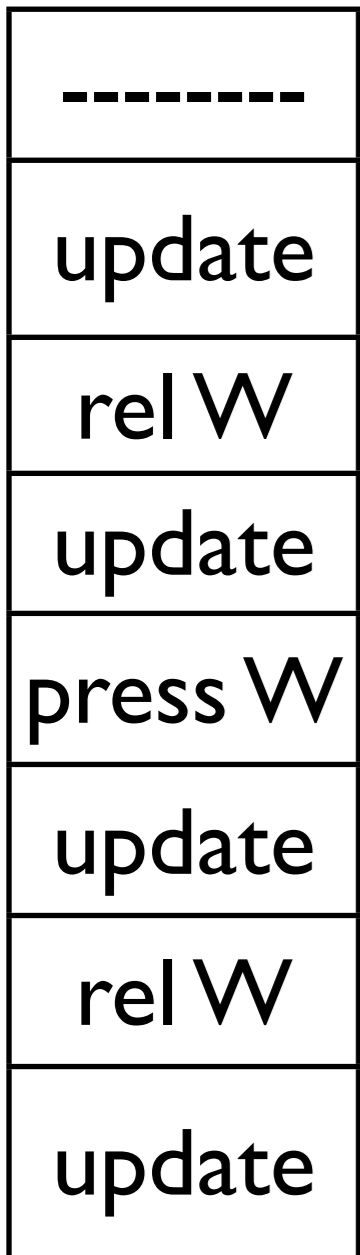
acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
initial	50	60	0	0	0
update	$+= 0$ 50	$+= 0$ 60	0	0	0
press A	50	60	0	0	0
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1
rel A	50	60	0	0	0.1
update	$+= 0$ 50	$+= 0$ 60	0	0	0.1
press W	50	60	0	0	0.1
update	$+= 0$ 50	$+= 0$ 60	$+= 0.01 \cos(0.1)$ 0.0099	$-= 0.01 \sin(0.1)$ = -0.001	0.1



Events and Info

acc_rate: 0.01
dec_rate: 0.005



Events and Info

acc_rate: 0.01
dec_rate: 0.005

ulx	uly	xv	yv	ang
-----	-----	----	----	-----

update
rel W
update
press W
update
rel W
update



Events and Info

acc_rate: 0.01
dec_rate: 0.005

ulx	uly	xv	yv	ang
50	60	0.0099	-0.001	0.1

-
- update
- rel W
- update
- press W
- update
- rel W
- update



Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50	60	0.0099	-0.001	0.1
update	+= 0.099 50.0099	+= -0.001 59.999	+= 0.01cos(0.1) =0.019	-= 0.01sin(0.1) = -0.002	0.1

-
- update
- rel W
- update
- press W
- update
- rel W
- update



Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50	60	0.0099	-0.001	0.1
update	$+= 0.099$ 50.0099	$+= -0.001$ 59.999	$+= 0.01 \cos(0.1)$ =0.019	$-= 0.01 \sin(0.1)$ = -0.002	0.1
rel W	50.0099	59.999	0.019	-0.002	0.1



update
rel W
update
press W
update
rel W
update

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang	
-----	50	60	0.0099	-0.001	0.1	↑
update	± 0.099 50.0099	± -0.001 59.999	$\pm 0.01 \cos(0.1)$ =0.019	$\mp 0.01 \sin(0.1)$ = -0.002	0.1	↑
rel W	50.0099	59.999	0.019	-0.002	0.1	
update	± 0.019 50.029	± -0.002 59.997	0.019	-0.002	0.1	
press W						↑
update						↑
rel W						
update						

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang	
-----	50	60	0.0099	-0.001	0.1	↑
update	± 0.099 50.0099	± -0.001 59.999	$\pm 0.01 \cos(0.1)$ =0.019	$\mp 0.01 \sin(0.1)$ = -0.002	0.1	↑
rel W	50.0099	59.999	0.019	-0.002	0.1	
update	± 0.019 50.029	± -0.002 59.997	0.019	-0.002	0.1	
press W	50.029	59.997	0.019	-0.002	0.1	↑
update						↑
rel W						
update						

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang	
-----	50	60	0.0099	-0.001	0.1	↑
update	$+= 0.099$ 50.099	$+= -0.001$ 59.999	$+= 0.01 \cos(0.1)$ =0.019	$-= 0.01 \sin(0.1)$ = -0.002	0.1	↑
rel W	50.099	59.999	0.019	-0.002	0.1	
update	$+= 0.019$ 50.029	$+= -0.002$ 59.997	0.019	-0.002	0.1	
press W	50.029	59.997	0.019	-0.002	0.1	↑
update	$+= 0.019$ 50.048	$+= -0.002$ 59.995	$+= 0.01 \cos(0.1)$ 0.029	$-= 0.01 \sin(0.1)$ -0.003	0.1	↑
rel W						
update						

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50	60	0.0099	-0.001	0.1
update	$+= 0.099$ 50.0099	$+= -0.001$ 59.999	$+= 0.01 \cos(0.1)$ =0.019	$-= 0.01 \sin(0.1)$ = -0.002	0.1
rel W	50.0099	59.999	0.019	-0.002	0.1
update	$+= 0.019$ 50.029	$+= -0.002$ 59.997	0.019	-0.002	0.1
press W	50.029	59.997	0.019	-0.002	0.1
update	$+= 0.019$ 50.048	$+= -0.002$ 59.995	$+= 0.01 \cos(0.1)$ 0.029	$-= 0.01 \sin(0.1)$ -0.003	0.1
rel W	50.048	59.995	0.029	-0.003	0.1
update					



Events and Info

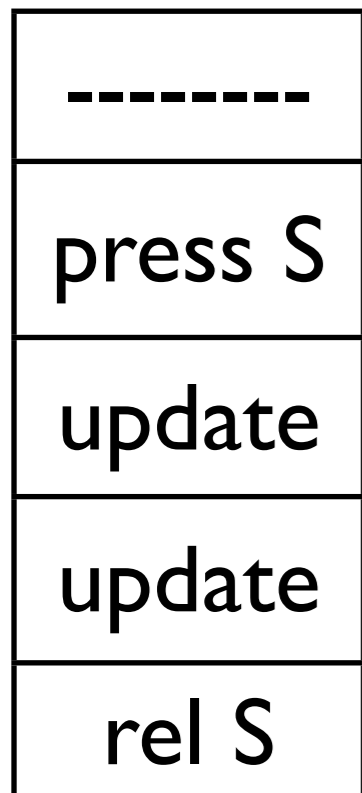
acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50	60	0.0099	-0.001	0.1
update	$+= 0.099$ 50.0099	$+= -0.001$ 59.999	$+= 0.01 \cos(0.1)$ =0.019	$-= 0.01 \sin(0.1)$ = -0.002	0.1
rel W	50.0099	59.999	0.019	-0.002	0.1
update	$+= 0.019$ 50.029	$+= -0.002$ 59.997	0.019	-0.002	0.1
press W	50.029	59.997	0.019	-0.002	0.1
update	$+= 0.019$ 50.048	$+= -0.002$ 59.995	$+= 0.01 \cos(0.1)$ 0.029	$-= 0.01 \sin(0.1)$ -0.003	0.1
rel W	50.048	59.995	0.029	-0.003	0.1
update	$+= 0.029$ 50.077	$+= -0.003$ 59.992	0.029	-0.003	0.1



Events and Info

acc_rate: 0.01
dec_rate: 0.005



etc, etc...

Note: you can add the acceleration to the velocity before adding the velocity to the position (if you want)

Events and Info

acc_rate: 0.01
dec_rate: 0.005

ulx	uly	xv	yv	ang
-----	-----	----	----	-----

press S
update
update
rel S



etc, etc...

Note: you can add the acceleration to the velocity before adding the velocity to the position (if you want)

Events and Info

acc_rate: 0.01
dec_rate: 0.005

ulx	uly	xv	yv	ang
50.077	59.992	0.029	-0.003	0.1

press S
update
update
rel S



etc, etc...

Note: you can add the acceleration to the velocity before adding the velocity to the position (if you want)

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50.077	59.992	0.029	-0.003	0.1
press S	50.077	59.992	0.029	-0.003	0.1
update					
update					
rel S					



etc, etc...

Note: you can add the acceleration to the velocity before adding the velocity to the position (if you want)

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50.077	59.992	0.029	-0.003	0.1
press S	50.077	59.992	0.029	-0.003	0.1
update	+ = 0.029 50.106	+ = -0.003 59.989	- = $0.005\cos(0.1)$ 0.024	+ = $0.005\sin(0.1)$ -0.0025	0.1
update					
rel S					



etc, etc...

Note: you can add the acceleration to the velocity before adding the velocity to the position (if you want)

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50.077	59.992	0.029	-0.003	0.1
press S	50.077	59.992	0.029	-0.003	0.1
update	+ = 0.029 50.106	+ = -0.003 59.989	- = 0.005cos(0.1) 0.024	+ = 0.005sin(0.1) -0.0025	0.1
update	+ = 0.024 50.130	+ = -0.0025 59.964	- = 0.005cos(0.1) 0.019	+ = 0.005sin(0.1) -0.0020	0.1
rel S					



etc, etc...

Note: you can add the acceleration to the velocity before adding the velocity fo the position (if you want)

Events and Info

acc_rate: 0.01
dec_rate: 0.005

	ulx	uly	xv	yv	ang
-----	50.077	59.992	0.029	-0.003	0.1
press S	50.077	59.992	0.029	-0.003	0.1
update	+ = 0.029 50.106	+ = -0.003 59.989	- = 0.005cos(0.1) 0.024	+ = 0.005sin(0.1) -0.0025	0.1
update	+ = 0.024 50.130	+ = -0.0025 59.964	- = 0.005cos(0.1) 0.019	+ = 0.005sin(0.1) -0.0020	0.1
rel S	50.130	59.964	0.019	-0.0020	0.1



etc, etc...

Note: you can add the acceleration to the velocity before adding the velocity fo the position (if you want)