

COMP 1010- Summer 2015 (A01)

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Hello!

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(or by appointment, arrange by email)

lab05

Submissions:

Careful of submissions!! You need to double check

Resubmission erases the prior one

Example: rose art all at once

Previously, t increases each time we draw. We see the rose petal get drawn.

Instead, draw the whole petal using a for loop

```
X = cos(k*t)*cos(t)*scale+250;
```

```
Y = cos(k*t)*sin(t)*scale+250;
```

Play with parameters

sum the odd numbers up until 50

→ iterate over all the odd numbers from 1 to 50

for (**initializer; condition; update**)

initializer?

set a variable to 1, the first odd number

```
int i = 1;
```

condition?

loop while the variable is less than or equal to 50

```
i <= 50;
```

update?

increment i by 2 to get the next odd number

```
i+=2
```

```
for (int i = 1; i <= 50; i += 2)
```

```
    sum += i;
```

count backwards with a for loop!!

what if you want to do...

for i from 20..1?

initializer: set i to the largest number

```
int i = 20;
```

condition: loop while i is bigger than or equal to 1.

```
i >= 1
```

update: reduce i by 1

```
i--
```

for (**initializer; condition; update**)

```
for (int i = 20; i >= 1; i--)
```

```
    println(i);
```

More loops???



NESTED LOOPS

note: as a code block acts just like any other code, you can put a **loop** or **if statement** inside of any **loop** or **if statement**

nested just means one thing inside another.

super confusing but common

what about...

```
int count = 0;
```

```
for (int i = 0; i < 10; i++) {
```

```
    for (int j = 0; j < 10; j++) {
```

```
        count++;
```

```
    }
```

```
}
```

```
println(count);
```

How many times will the outer loop run? (i)

How many times will the inner loop run? (j)

note: the i loop will iterate 10 times. Each time the j loop is invoked it will run 10 times. The j loop is invoked 10 times, once per iteration of the i loop. Therefore, the j loop iterates 100 times. count == 100

Test- do a println trace

```
for (int i = 0; i < 10; i++) {  
    for (int j = 0; j < 10; j++) {  
        println(i);  
    }  
}
```

print j

Use a nested for loop to draw size 2 ellipses on a grid

Make one loop go through all the columns

For each column, go through all the rows

Turn the column,row position into x,y

Draw an ellipse

Visual trace to think about the loops

Draw a line from the last x,y to the current one to visualize how the row and column variables change

What happens if we reverse the row/col for loops?

Example: raster graphics

Set each pixel on the canvas separately, to make complex images

Setup a nested for loop to go through every pixel:

- first a loop through the x,
- then a loop through the y
- set to some color

Slow!!

Speedup methods

noSmooth() in setup

smaller screen

Make the color depend on the distance to the mouse

Reminder:

$$\text{distance} = \sqrt{(\text{mouseX} - x)^2 + (\text{mouseY} - y)^2}$$

Use helper variables to simplify it

New command: sqrt!

```
float sqrt(float);
```

Set the color to the distance

Use mod to wrap it around

Play with the color formula..

- `float c = (dist*dist)%256;`
- `float c = (dist*x)%256;`
- `float c = (dist+x-y)%256;`
- `float c = (dist*x/(y+1))%256`