COMP 1010- Summer 2015 (A01)

Jim (James) Young

young@cs.umanitoba.ca

jimyoung.ca

the Java for loop syntax!

```
for (initialization; condition; upkeep)
{
    body;
}
```

```
for (int i = 0; i < 10; i++)
{
    line(0, cellSizeY*i, width-1, cellSizeY*i);
}
```

1   **2**   **4**
3

1,2,3,4,
2,3,4
2,3,4

comparison

```
for (int x = 1; x <= 10; x++)
{
  println(x);
}
How about…

for (float x = 0.1; x <= 1.0; x += 0.1)
{
  println(x);
}
```

Floating point is not exact!!!!

Due to the way computers store floating point numbers, we get strange rounding and precision errors

Floats cannot be trusted for exact numbers!

- don't use them in for loops, use ints instead

- don't use them for serous money

- cannot trust exact comparisons…

Floats: cannot trust equals comparisons

```
if (0.7 == 0.7)
{
  println(1);
}



if (0.7 == 0.6+0.1)
{
  println(1);
}
```

Floats: cannot trust equals comparisons

What to do!?!?!?

Use <, <=, >, >= whenever possible

If you need to test if they're EQUAL, check if they are CLOSE enough....

Advanced:

      float threshold = 0.001;

      if (abs(f1-f2) < threshold)...

Don't use floats in for loops

Convert the loop to integers, and convert to floats

Instead of..

for (float t = 0; t<=1; t+= 0.1) // ten times..

float steps = 10;

for (int i = 0; i <= steps; i++)

{

      float t = i/steps; // careful of int division
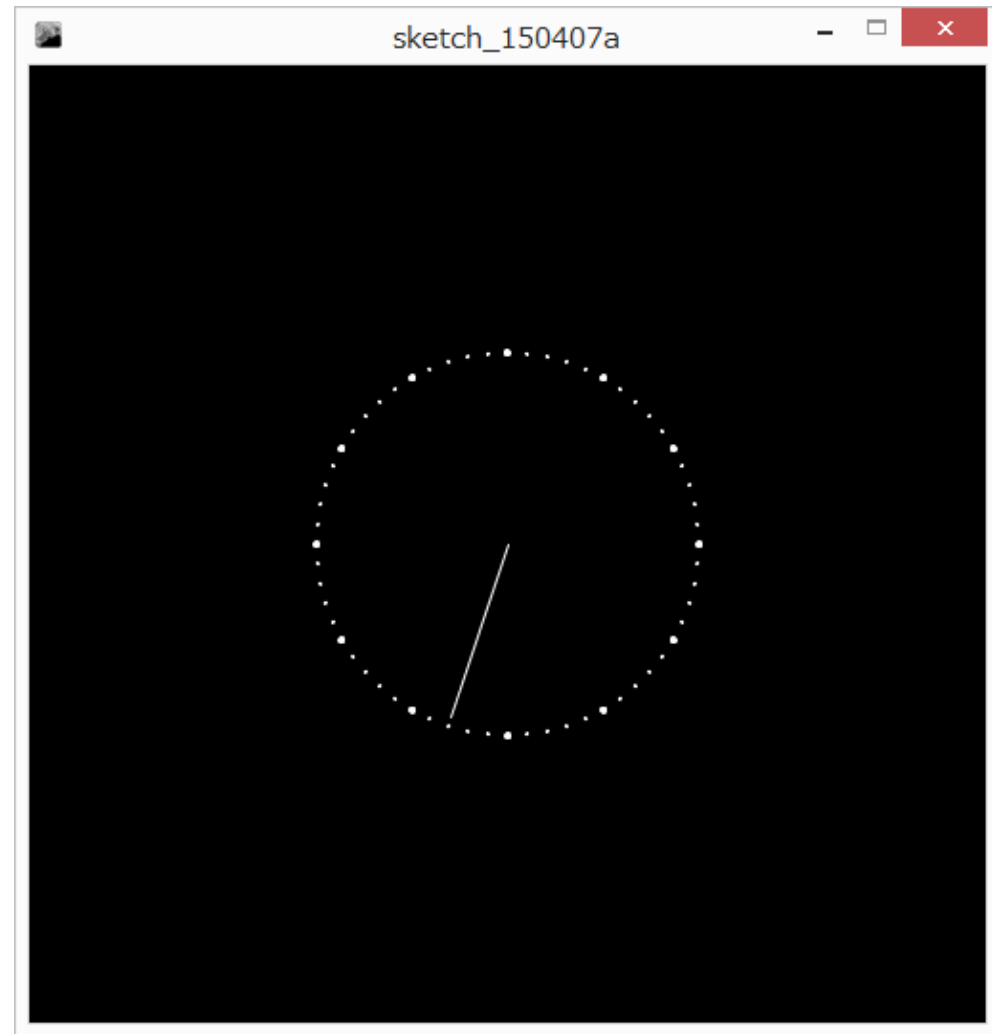
}

Example: clock

circle of dots

every fifth dot larger

second hand
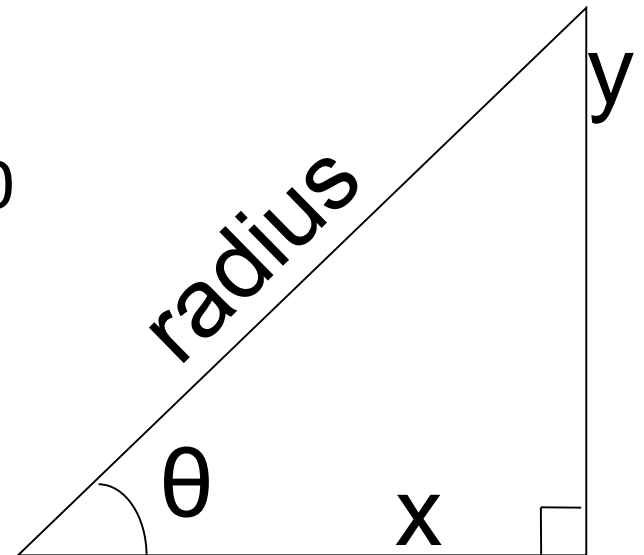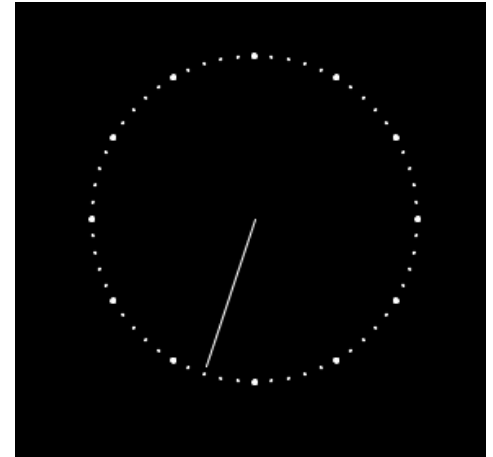
circle of dots

60 dots

1) Calculate angle to a given dot i

2) Given angle, calculate x and y

      (setup globals for clock)

3) Wrap in a for loop to do for all 60

circle of dots

How to make every 5th a different size?
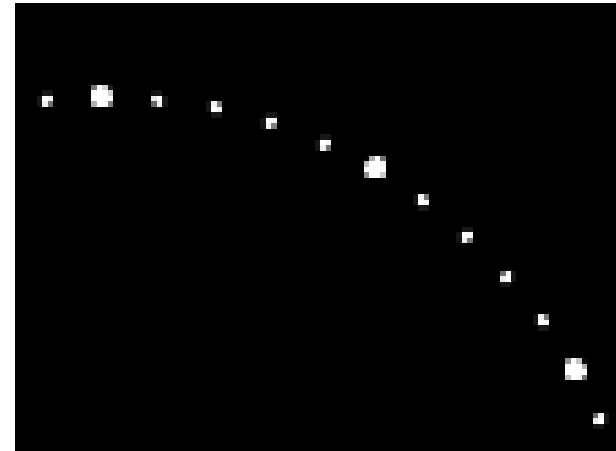
Use modulo!

reminder: number modulo 5, i%5, gives 0 when?

when i/5 has no remainder.

i=0, i=5, i=10, …. i=55

if (i%5 == 0)…

Second hand

New command!

int second(); // returns the current seconds from the system clock

map seconds to a corresponding tick mark

Draw the second hand

exercise

Add hour and minute hands

Warning: will require some tricky math to make the hand point in the right direction. E.g., 12:00 should be straight up, but 0 degrees is along the positive x axis.

exercise

Smooth the second hand

 - use the millis() command, number of milliseconds since program started

WARNING : not number of milliseconds in minute or second, requires tricky math

Circle trail around mouse

First draw one circle and make it rotate (old)

Then, draw X circles behind that one!

     for loop: on # of circles (int), not on angle

Make the circle fade out

Make the circle shrink