COMP 1010- Summer 2015 (A01)

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Make the color depend on the distance to the mouse

Reminder:

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

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

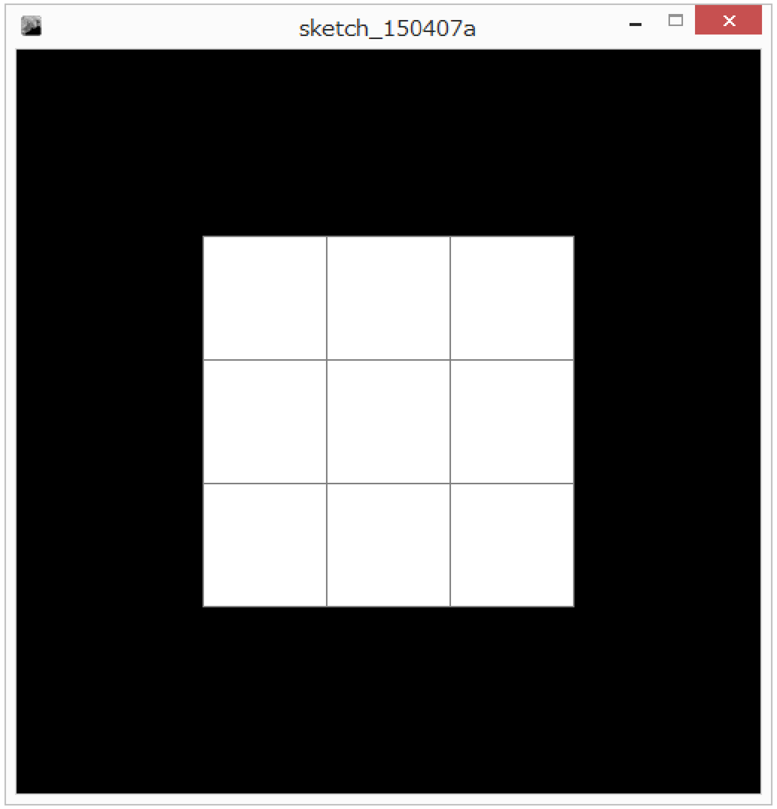
Play with the color formula..

- Use color!
- Red – absolute x distance of mouse from point
  - x – mouseX
    - What if it’s negative? We want distance
      - abs(number) – absolute value
- Green – absolute y distance of mouse from point

Example: basic tic-tac-toe board

Setup variables

- board grid
- board size
- tile size
- boardCenterX,Y
- Board Left / Top



Setup the for loops

Iterate over tiles i (width), j (height)

Calculate left and top of each tile

Place a rectangle at the tile location

Is the mouse inside any of the tiles?

Update the for loop – while drawing, check to see if the mouse is inside

Add helper variables: right, bottom

Basic logic:

```
    if mouse is to the right of left wall
    to the left of the right wall
    below the top wall
    above the bottom wall
```

Change the color

exercise

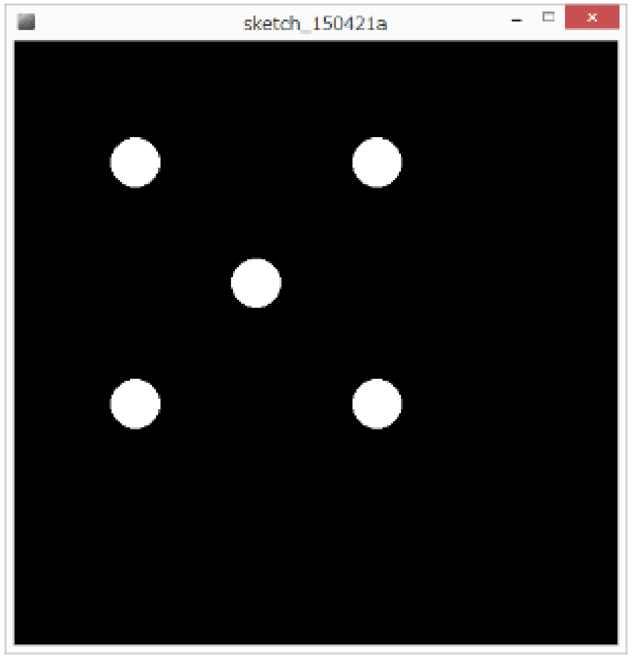
Try drawing X and O instead of changing the color

For loop and boolean exercises

Draw a dice face

First, setup globals

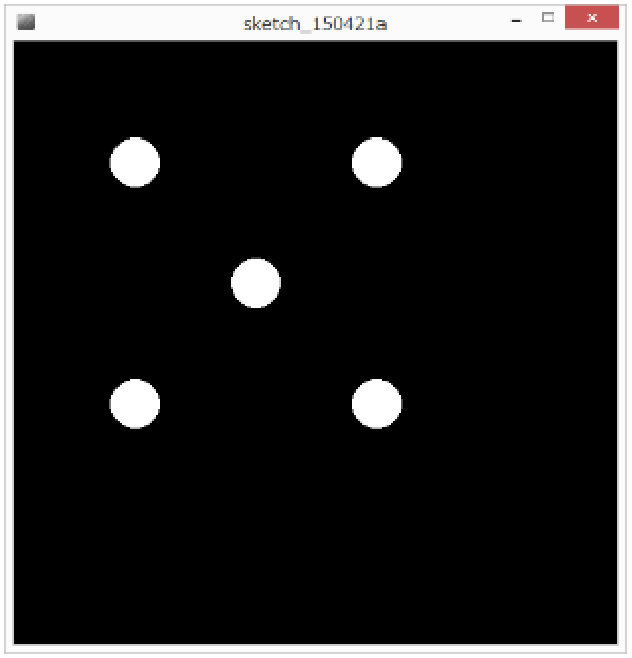
- diceGrid
- diceSize
- diceSpacing
- left
- top
- dotSize



For loop for dice

Setup the nested for loop iterating over i,j and draw a dot grid.

Use boolean logic to do one diagonal – a three!

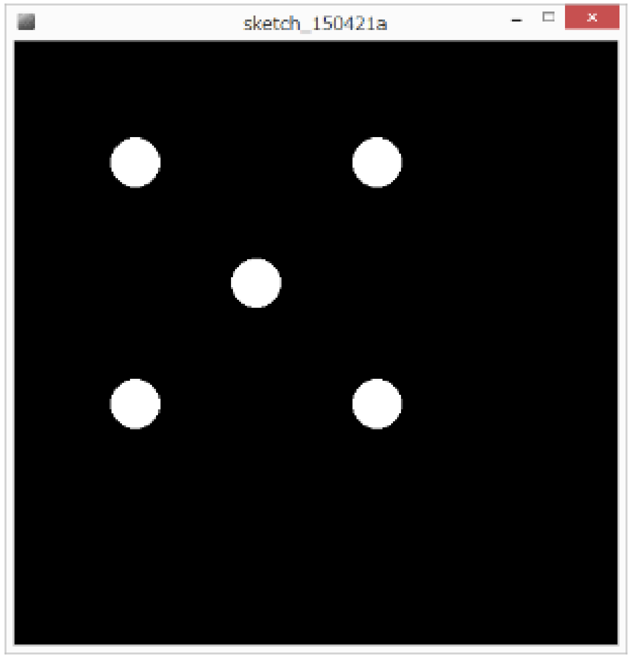


Two diagonals for a 5

Other diagonal?

i (x)	j (y)
0	2
1	1
2	0

Combine with an OR



exercise

Do the other common dice faces

Compiling and the Java Virtual Machine!!

what does this mean, anyway??

Processing is basically Java

computers can only understand binary!!

binary is a counting system that only has 0s and 1s.

"It was just a dream Bender, there's no such thing as two."

computers cannot understand programing languages like Processing!

programming languages are designed for people

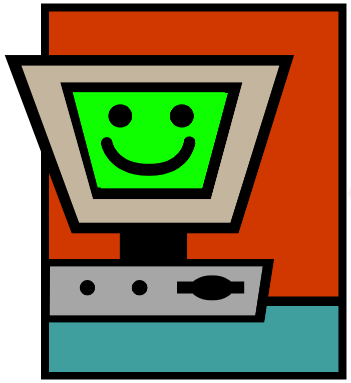
human-readable computer code

```
float left = 100;
float top = 100;
float dotSize =
50;

void setup()
{
size(canvasSize,ca
nvasSize);
}
```

compiler

a compiler program can read human-readable code, and translate to **machine language**



computers do not know how to
huma

machine language

```
10101001101010
01010100100010
00101011101001
10101010001001
10101001010100
10001000101011
10100110101010
10101010010101
```

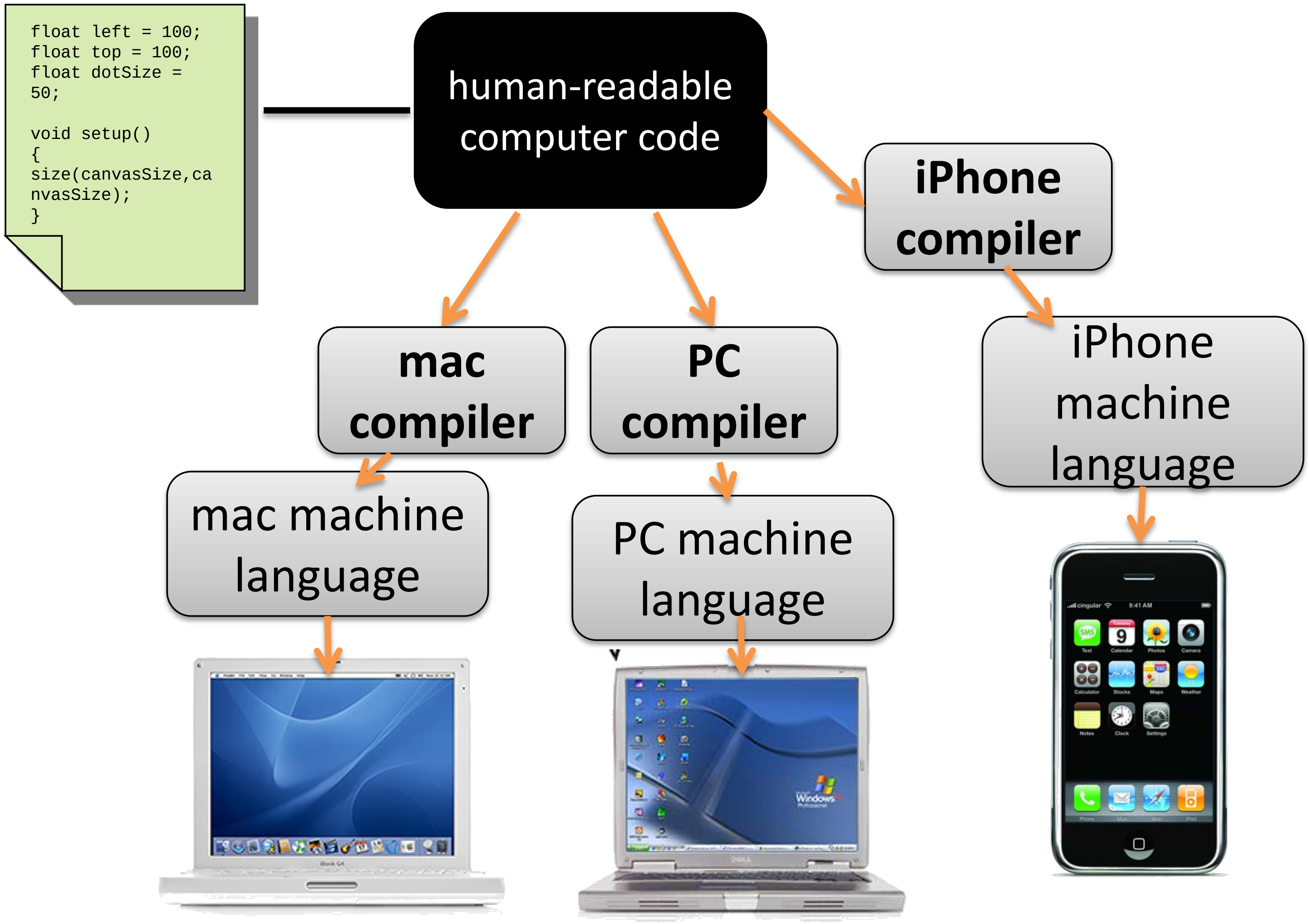
compilers are necessary

note: a program **must** be **compiled** before it can be run by a computer. When you buy software or download a program, it is usually already compiled and packaged to run.

complication…

different computers speak different languages..

there are **many** machine languages



```
float left = 100;
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```

Not scalable

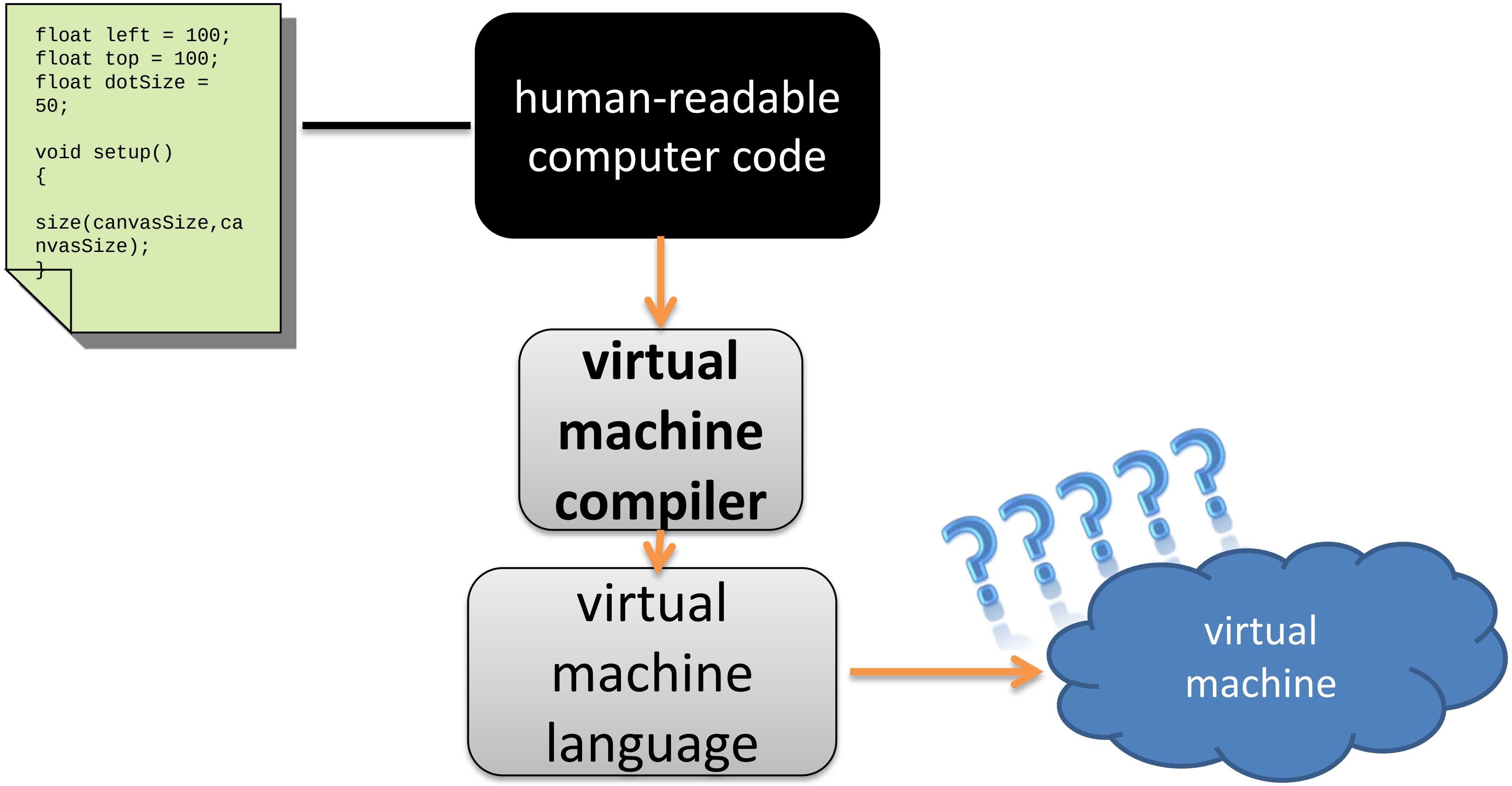
what if a new platform is introduced??

for new platforms, you need to make a new compiler to convert human-readable code to machine code

EVERY program must be re-compiled, debugged, updated, to make it work

solution: a **virtual machine**

rather than compiling a program to run on a specific machine, we compile a program to run on some imaginary **virtual machine**.



```
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}
```
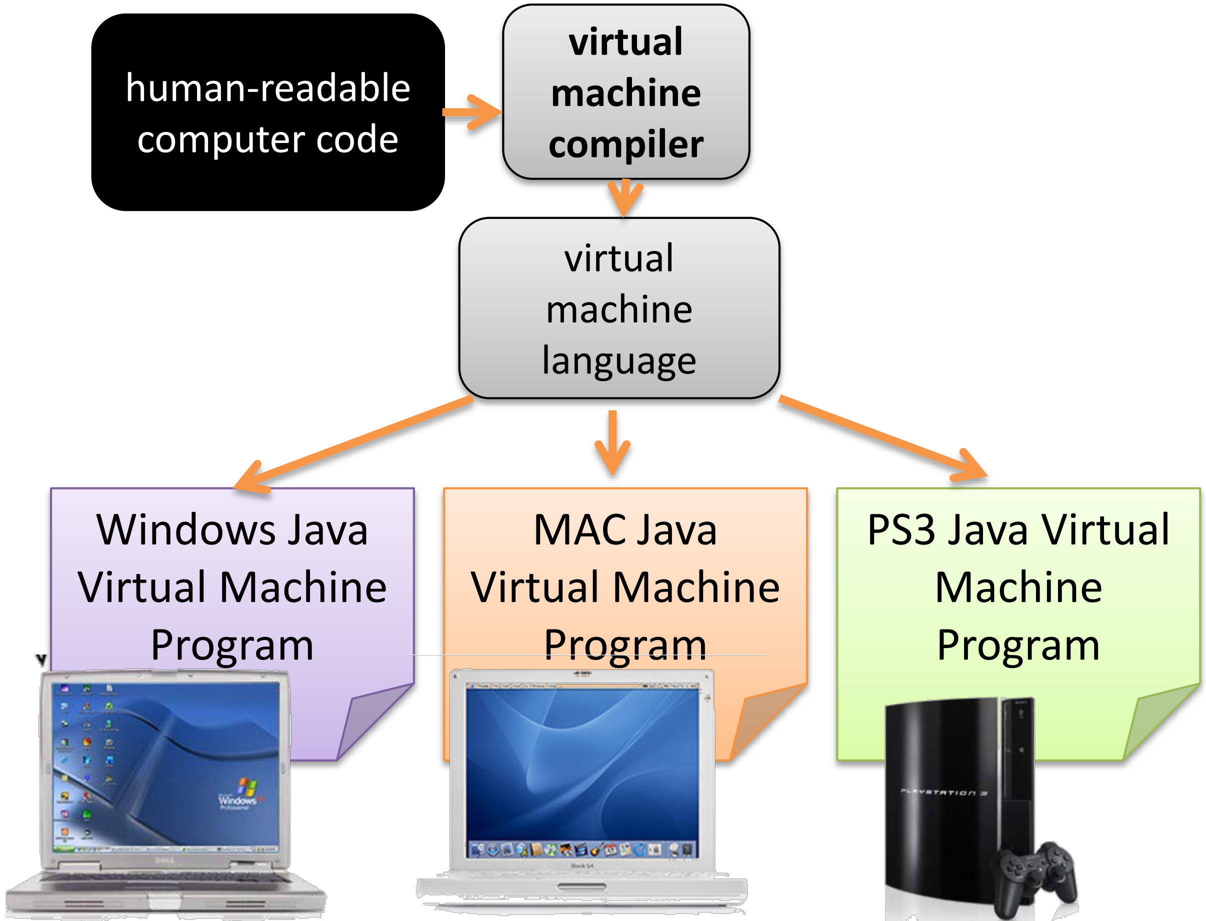

JAVA has **virtual machine** programs, or emulators, for many platforms!

A **virtual machine** program can read and execute (run) **virtual machine code**


human-readable computer code
virtual machine compiler
virtual machine language
Windows Java Virtual Machine Program
MAC Java Virtual Machine Program
PS3 Java Virtual Machine Program

scalable!

what if a new platform is introduced??

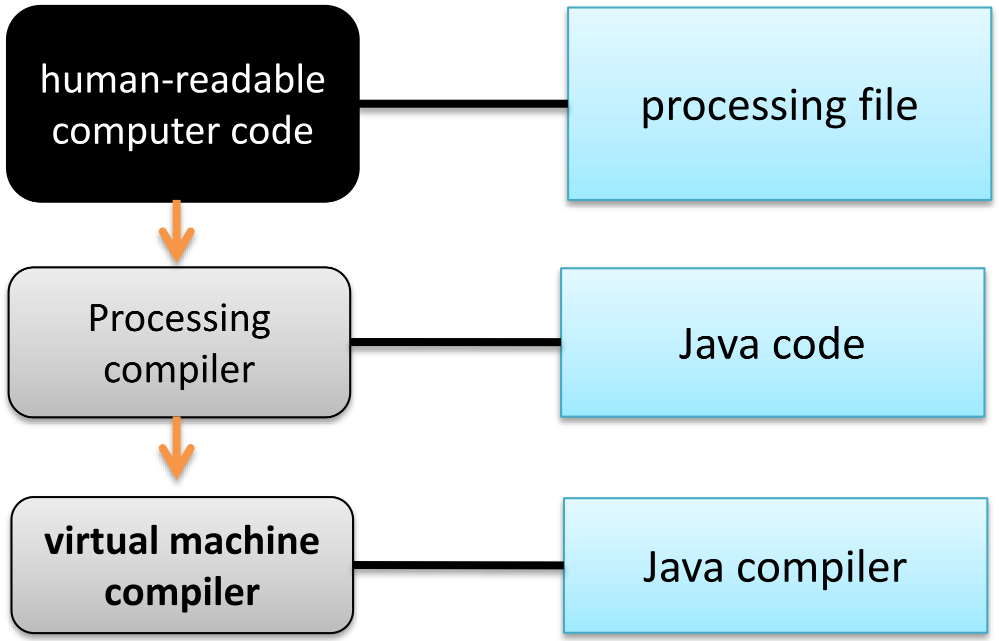
for new platforms, you need to make a new Java virtual machine

Then, all your existing Java programs will run!! no need to recompile them!

terminology and convention

human-readable computer code	processing file Source code	store a program written in the programming language in this file
virtual machine compiler	Java compiler	many versions! Sun (inventors), Eclipse compiler, others…
virtual machine language	Java byte-code	machine instructions for the virtual machine – not human readable
virtual machine language file	.class file	produced by the Java compiler, not human readable. Gets run on the virtual machine
Targeted Java Virtual Machine Program	JVM – Java Virtual Machine	specific to your platform (windows, etc..). Many versions available

Where does Processing fit in???



summary

programming languages are designed for humans – computers cannot understand them

a **compiler** converts human-readable programming into platform-specific **machine language**

the **Processing compiler** converts your program into Java

the **Java compiler** converts a Java program into **Java byte code-** the machine language for the **Java Virtual Machine (JVM)**

the **Java byte code** can be run on any **JVM –** these are available for many computers / platforms.

things to do!

just understand the basic concepts of the JVM and what compiling is

MIDTERM CUT OFF!!