

Getting Started

As A Software
Engineer

Me

Blog: spiegelMOCK.com

Facebook: <http://Mischa.lol>

@revmischa

This Talk

is about...

What Should

I

Know???

- Technical topics
- Skills
- Human interaction
- Community
- Learning

Technical
Topics



What is
a Computer?

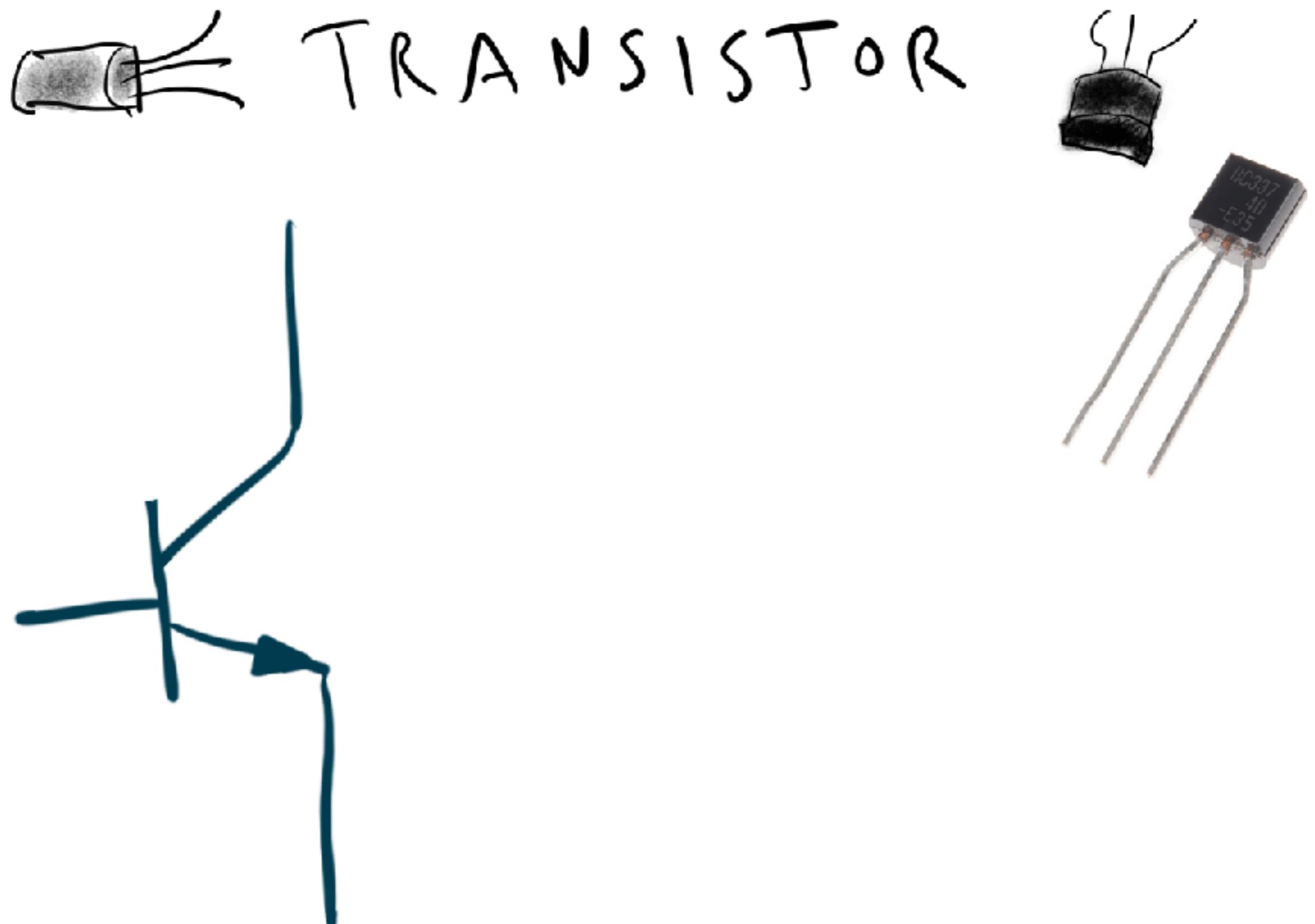
What is
a Computer?



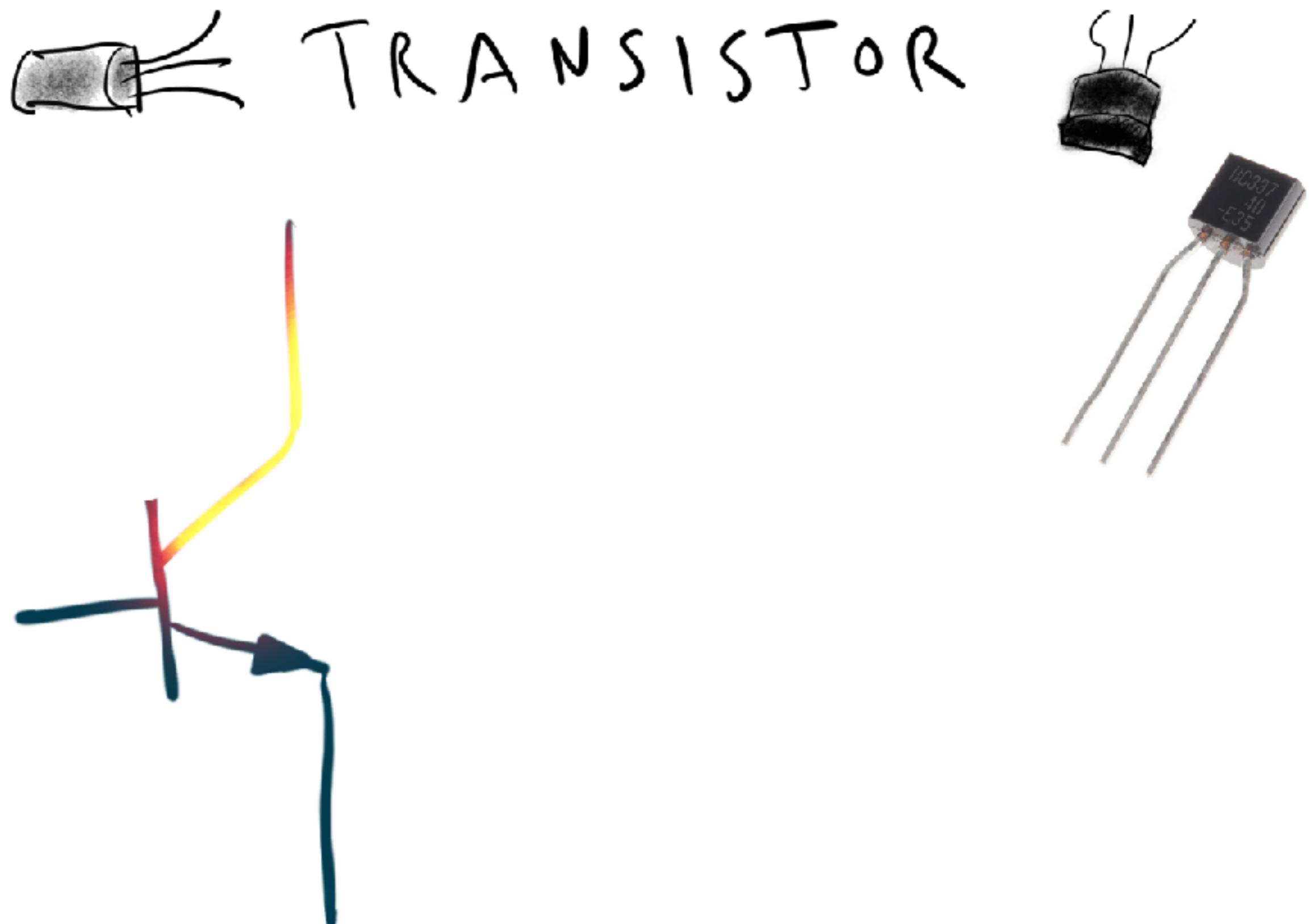


Central Processing Unit

How Do CPUs Work?

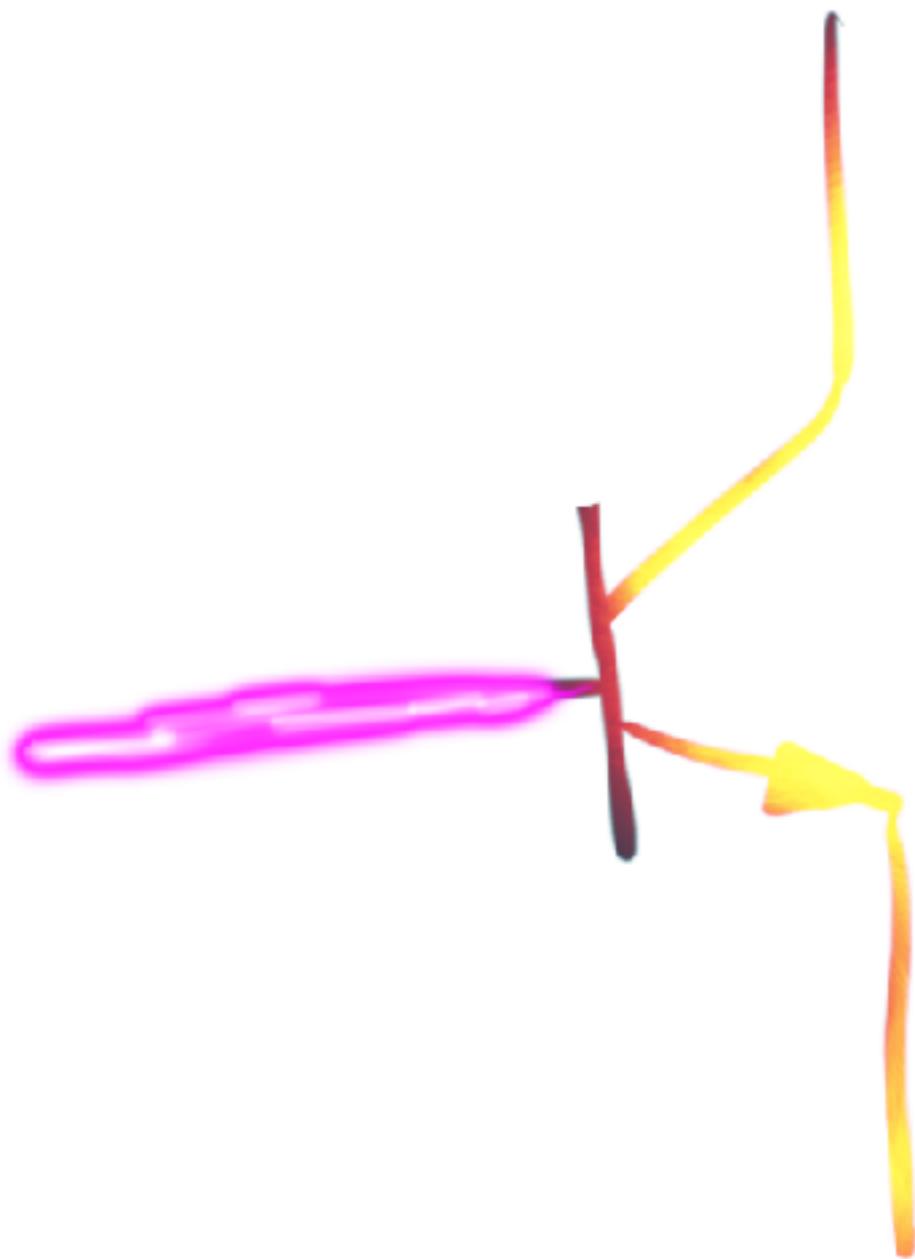
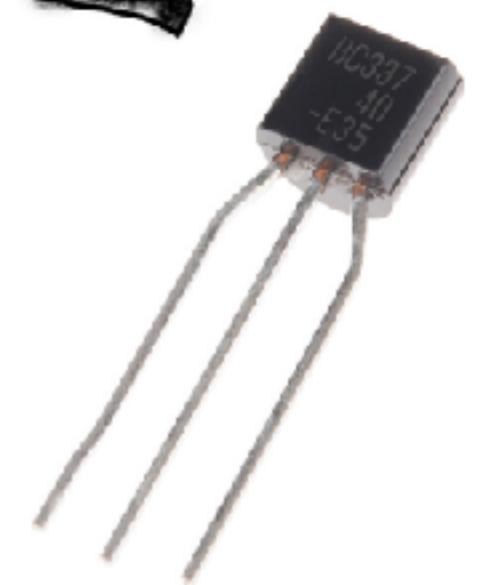


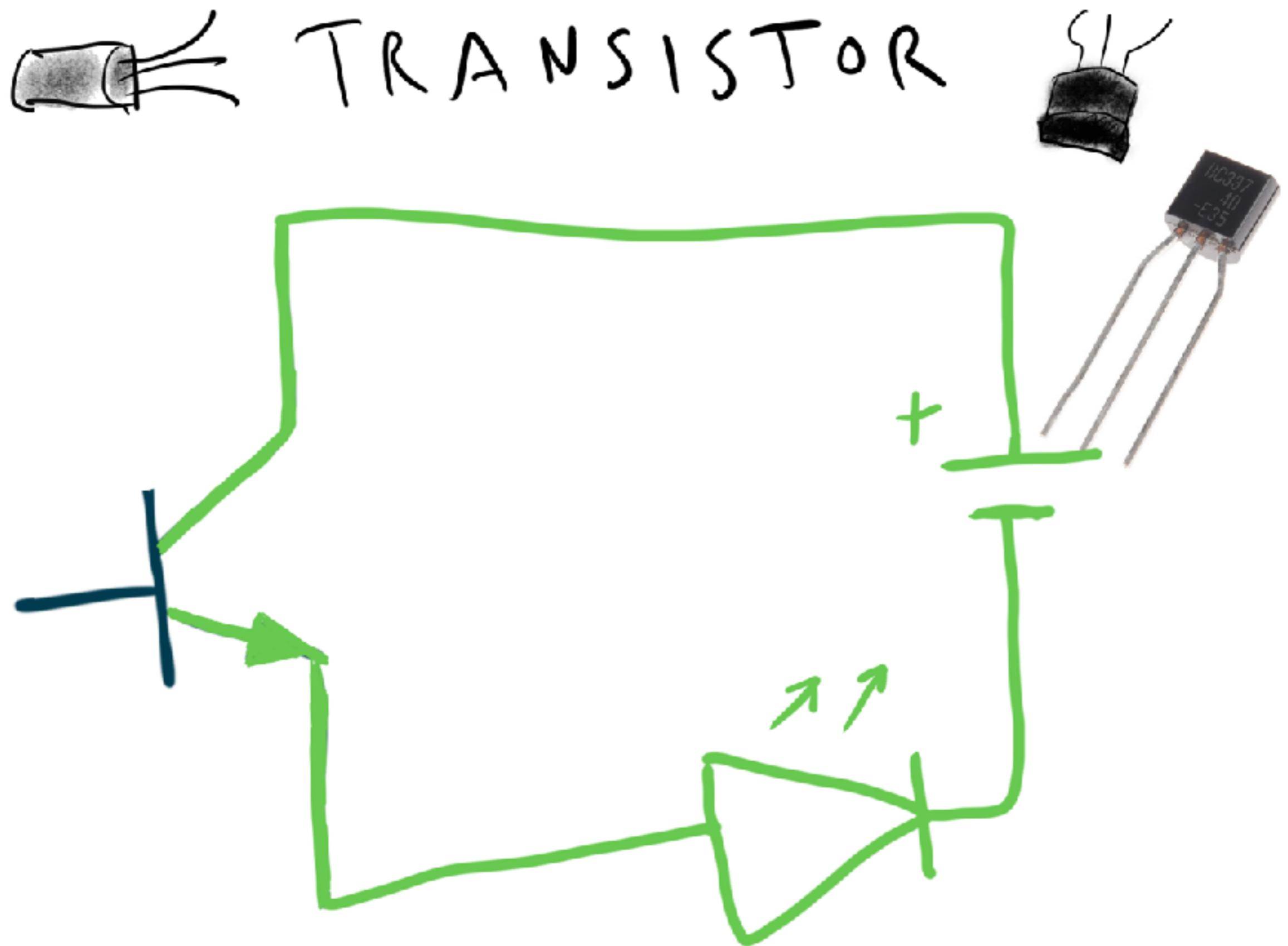
Intel Broadwell-EP Xeon: 7.2 billion

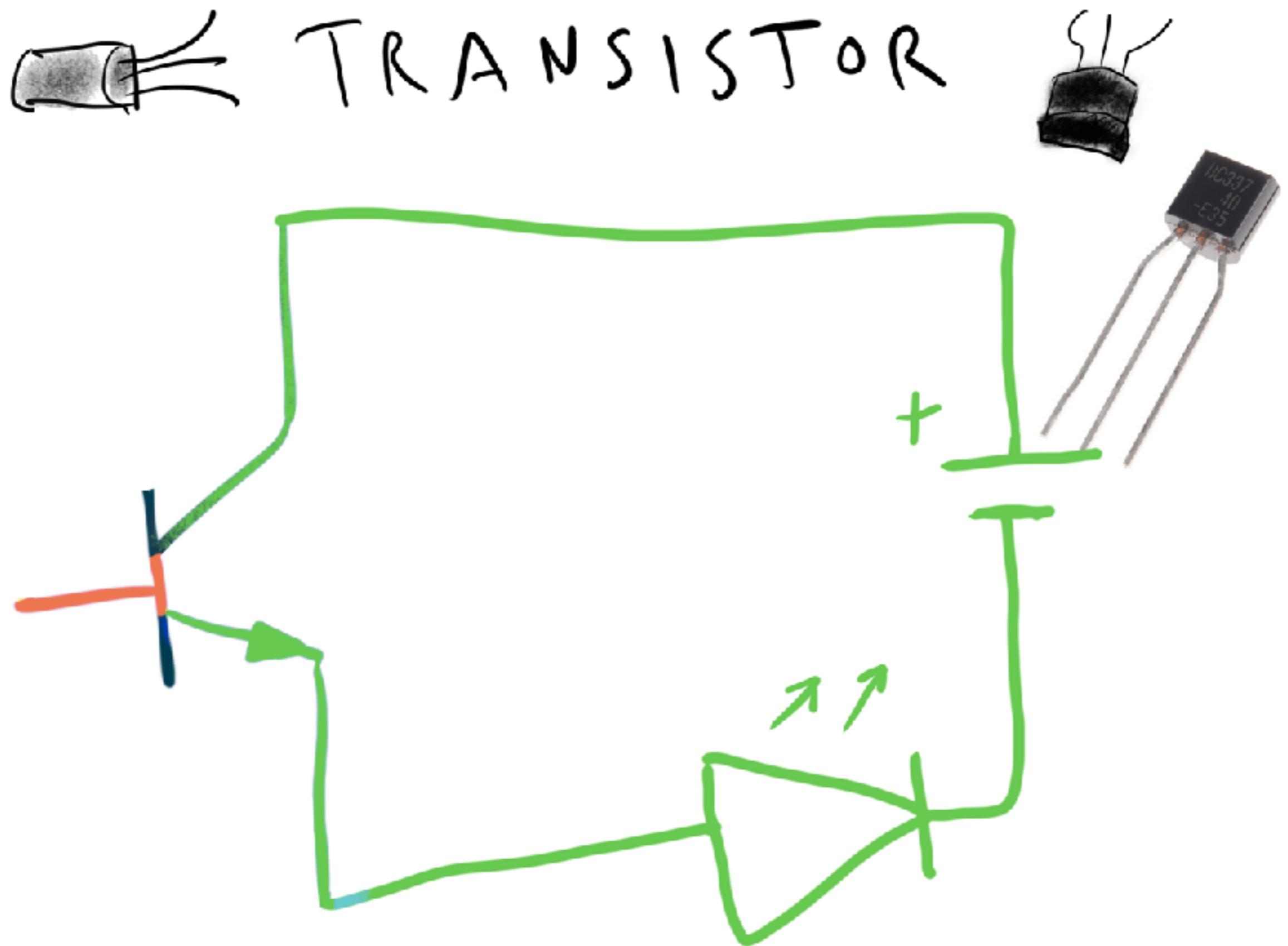




TRANSISTOR



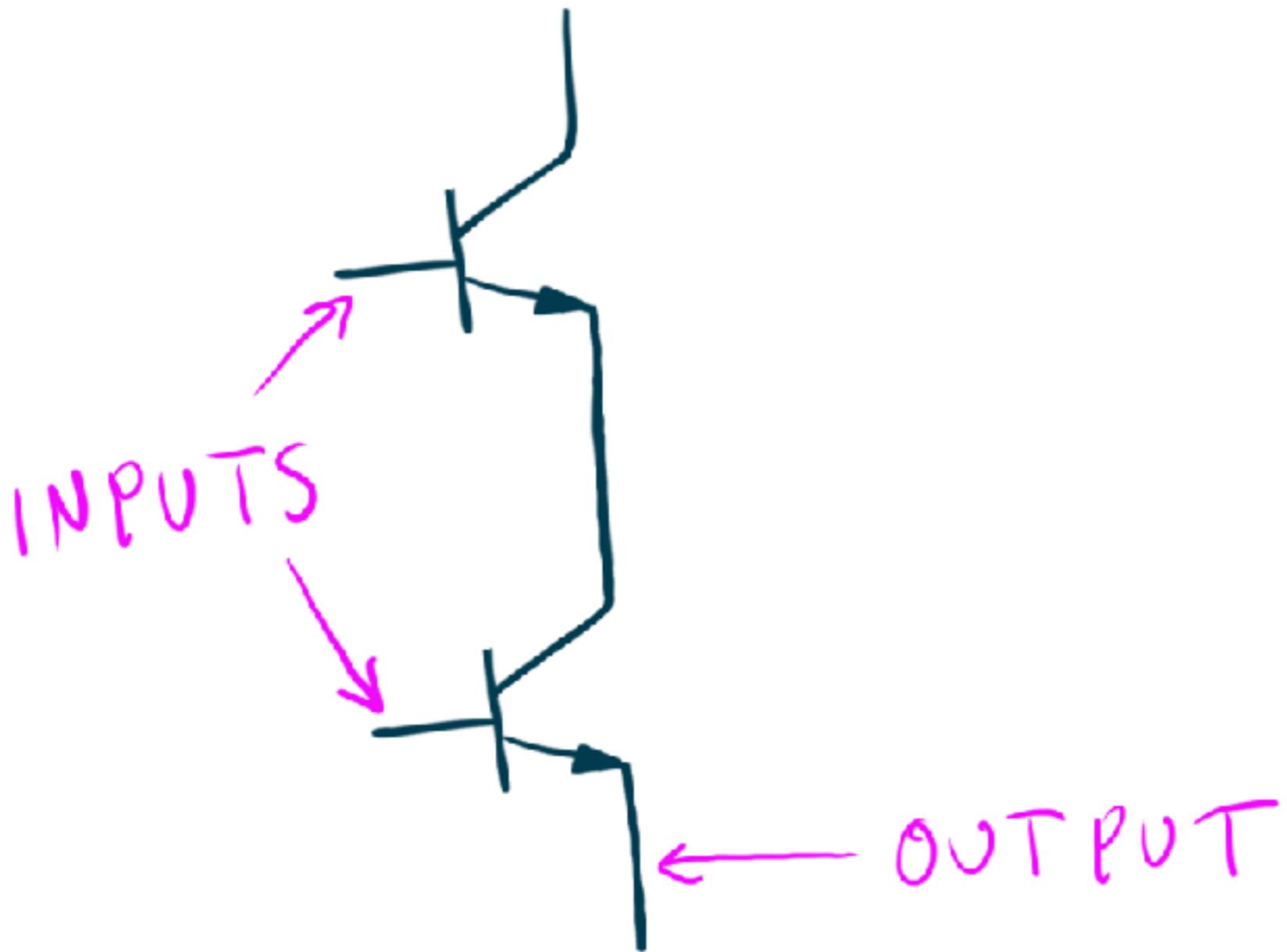
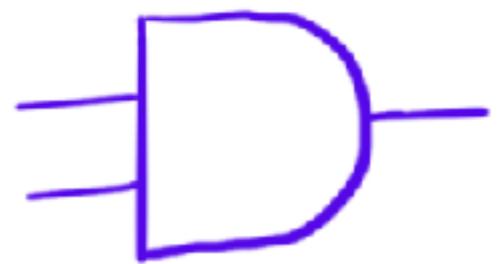




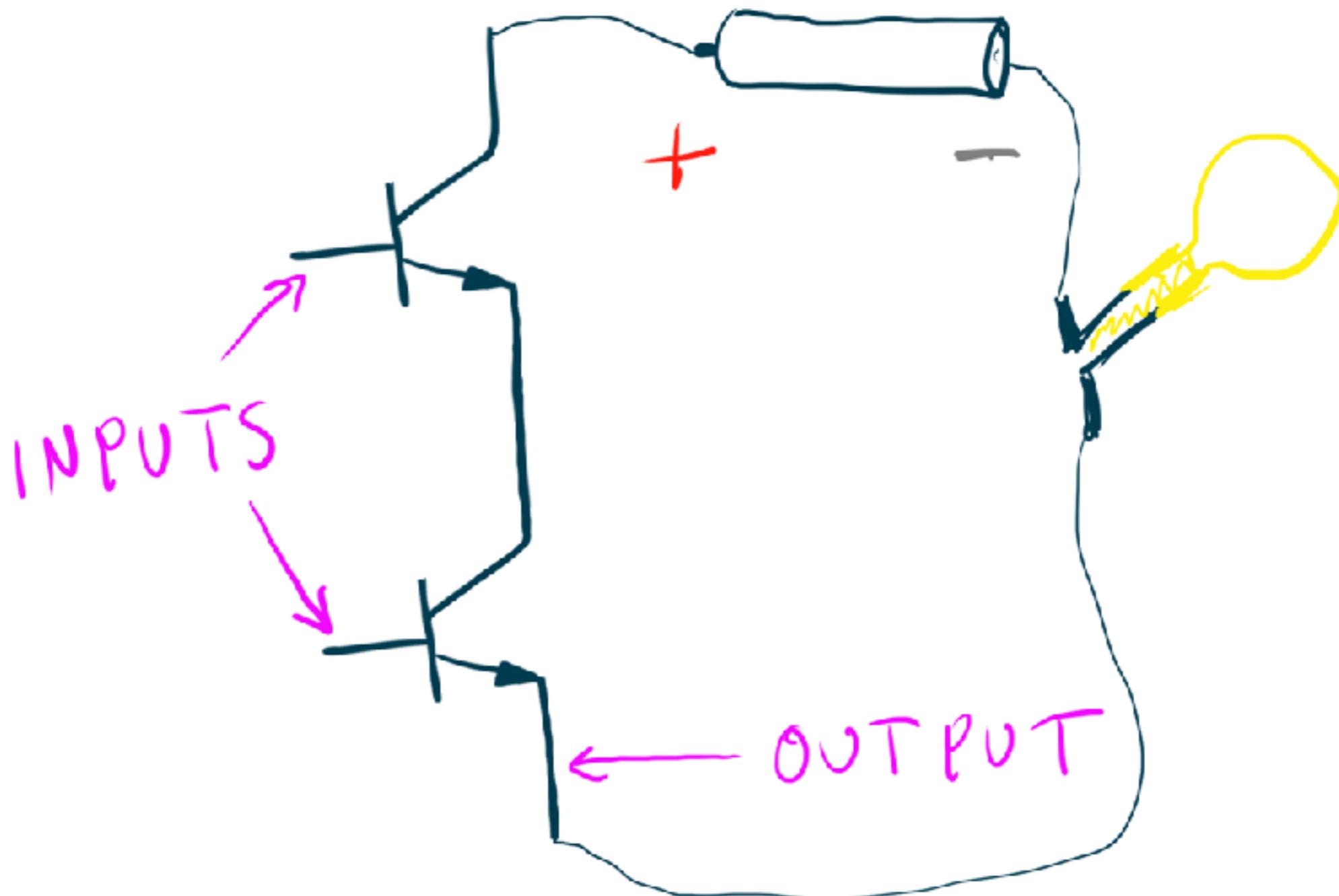
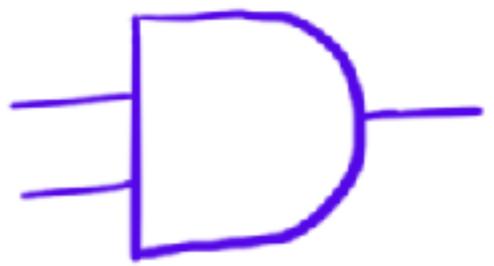
Logic Gates

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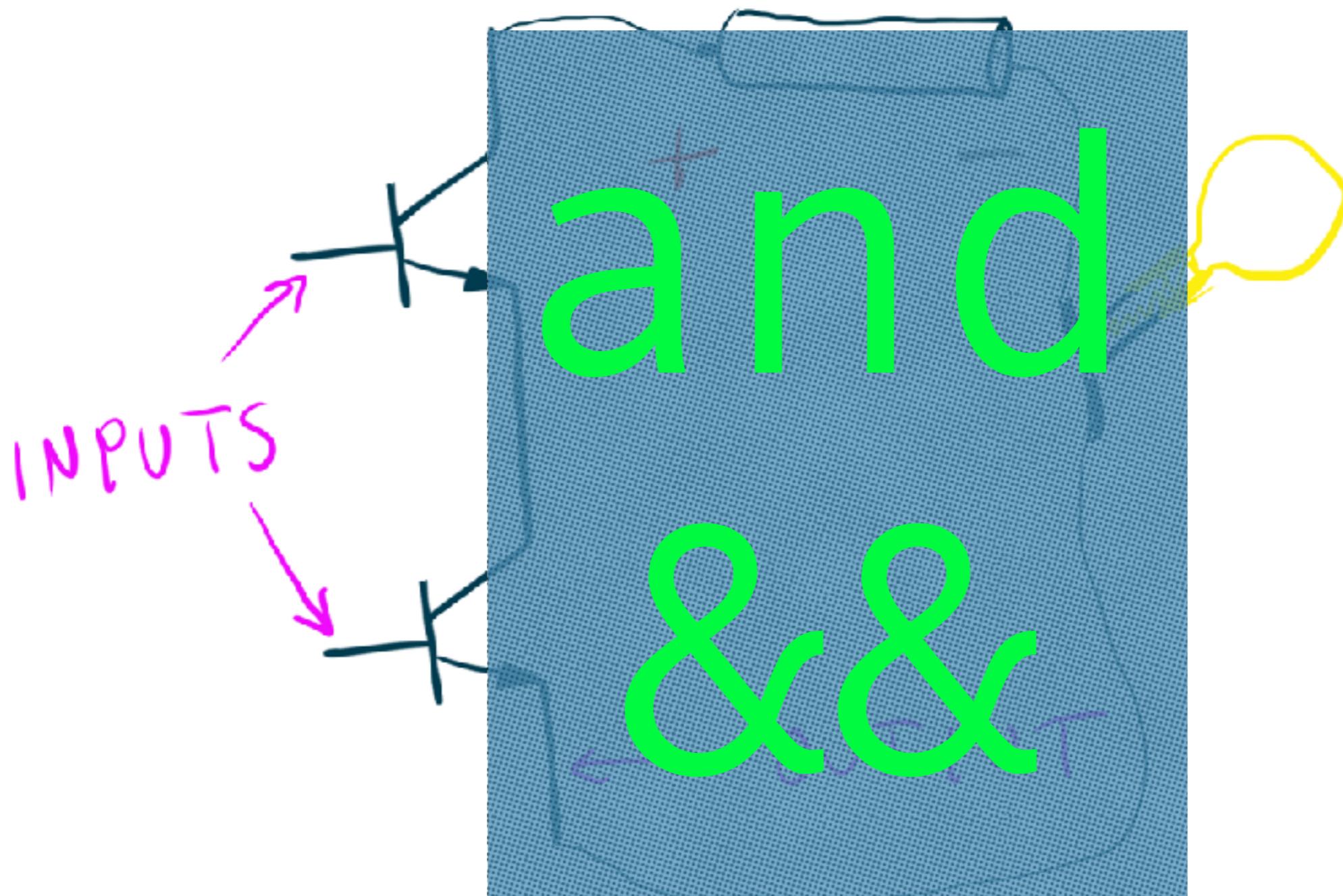
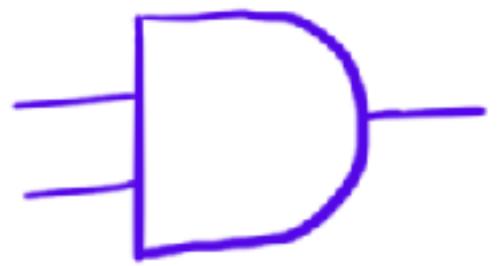
AND GATE



AND GATE

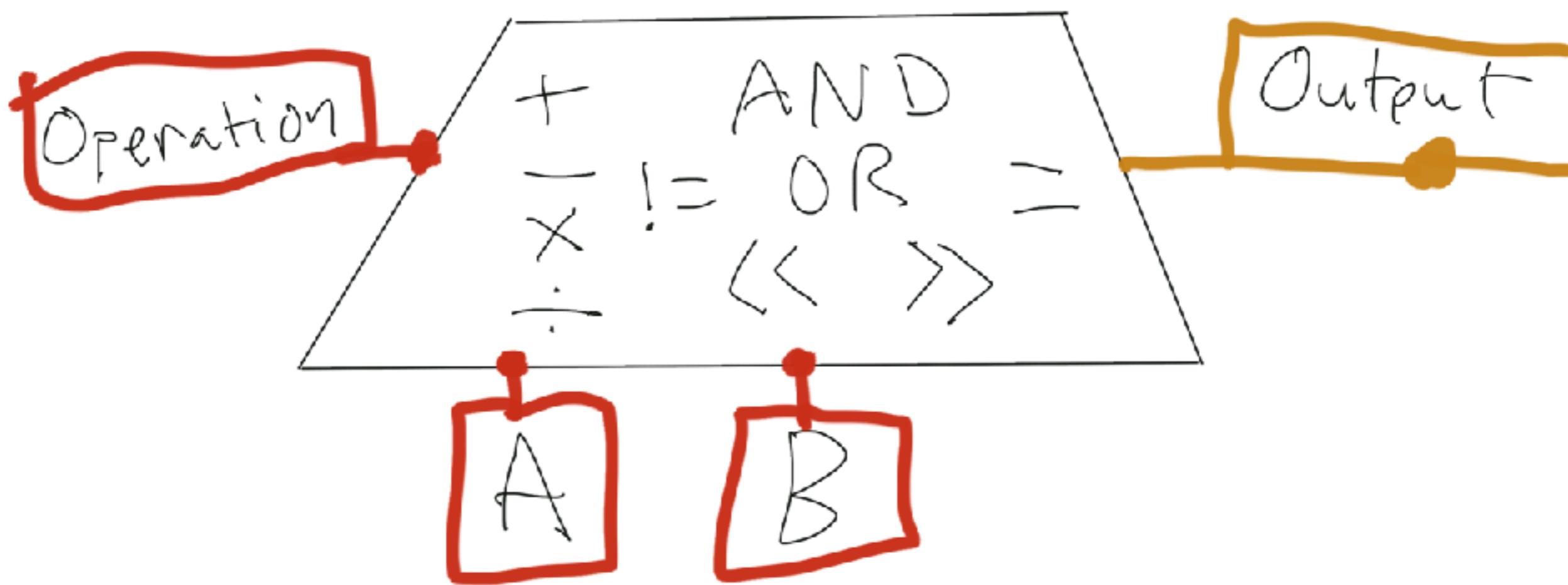


AND GATE



ALU

Arithmetic & Logic Unit

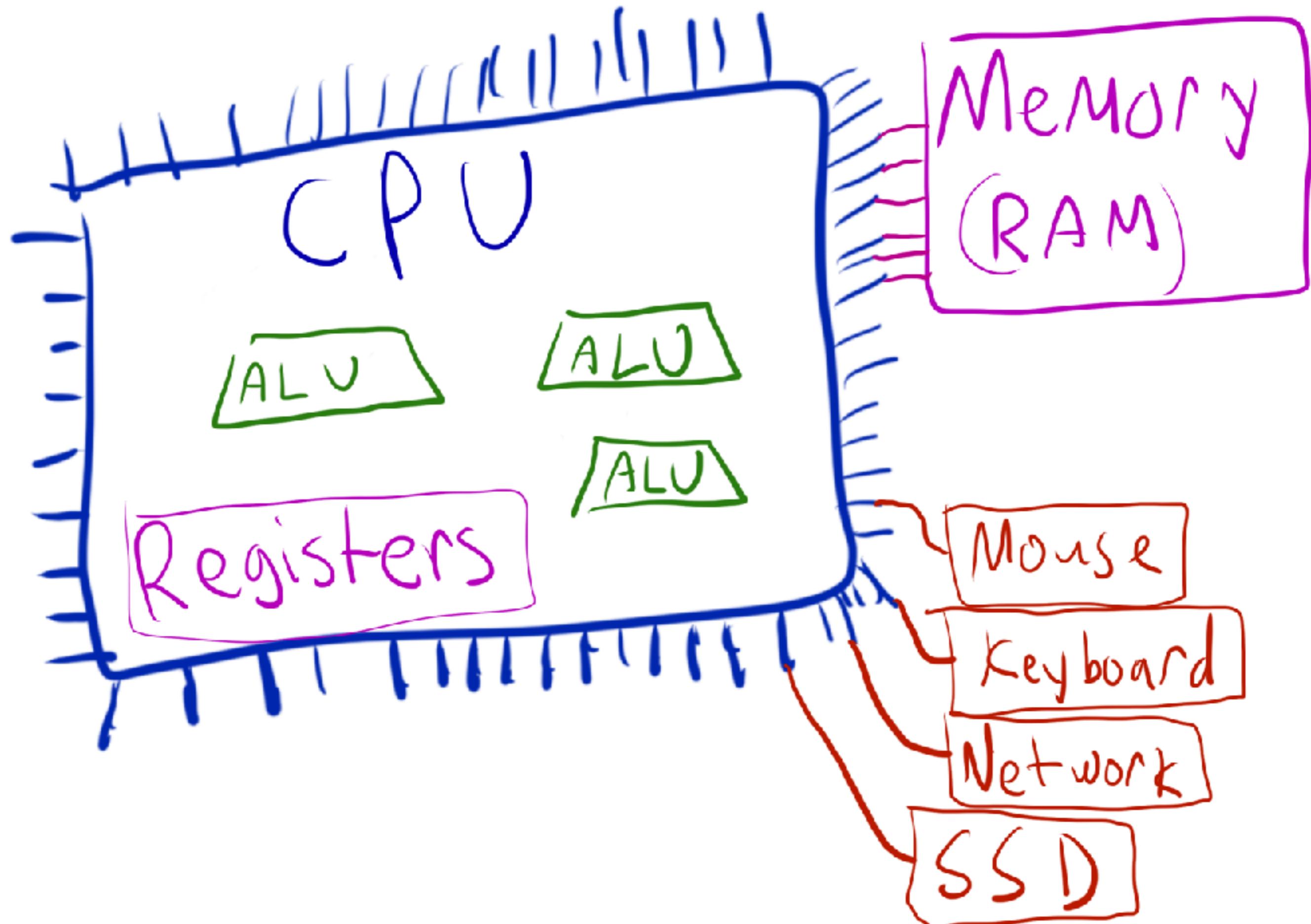


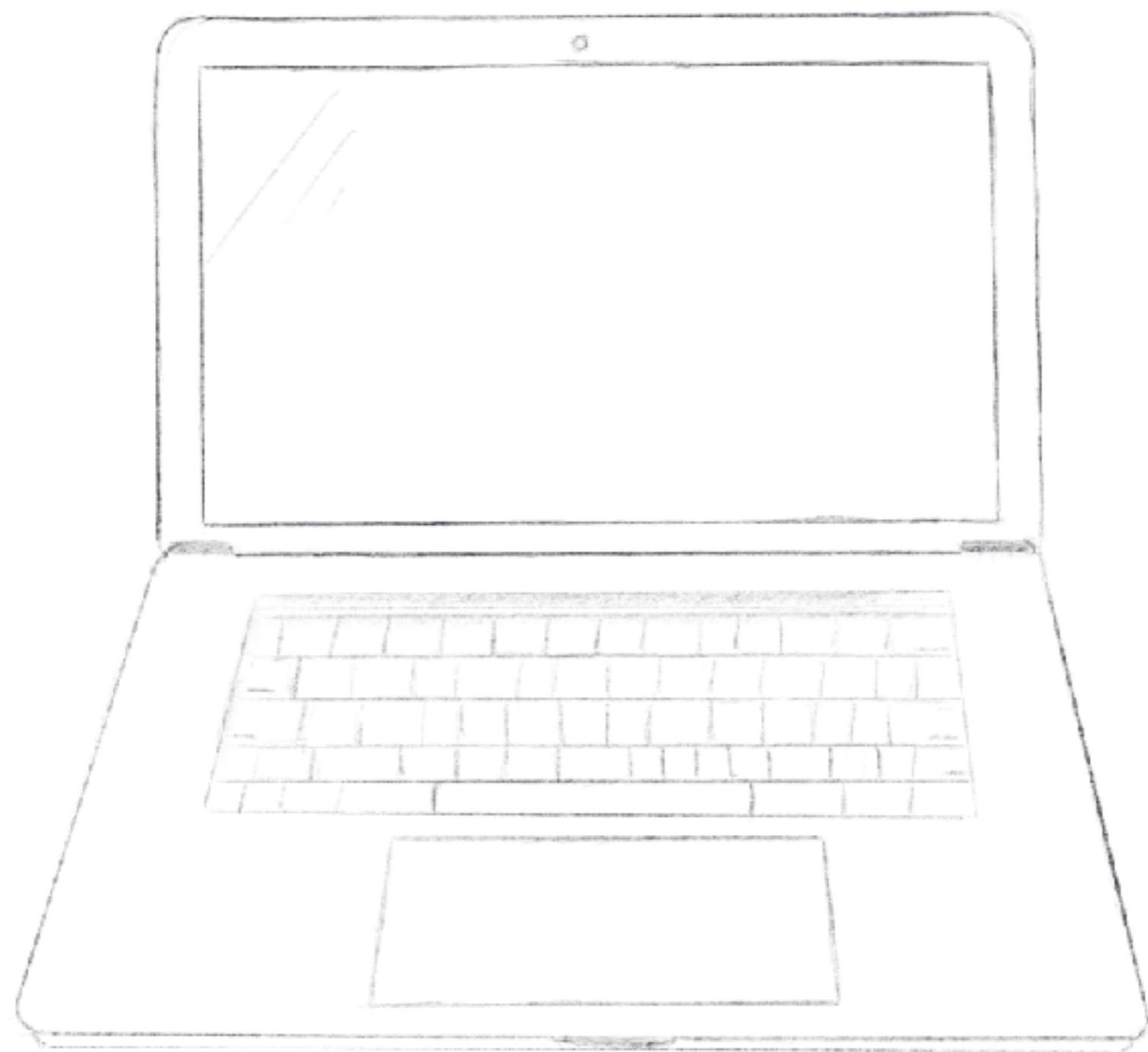
Registers



Main Memory

(RAM)





“Computer science is the study of algorithms”

—Donald Knuth

“Computer science is the study of algorithms”



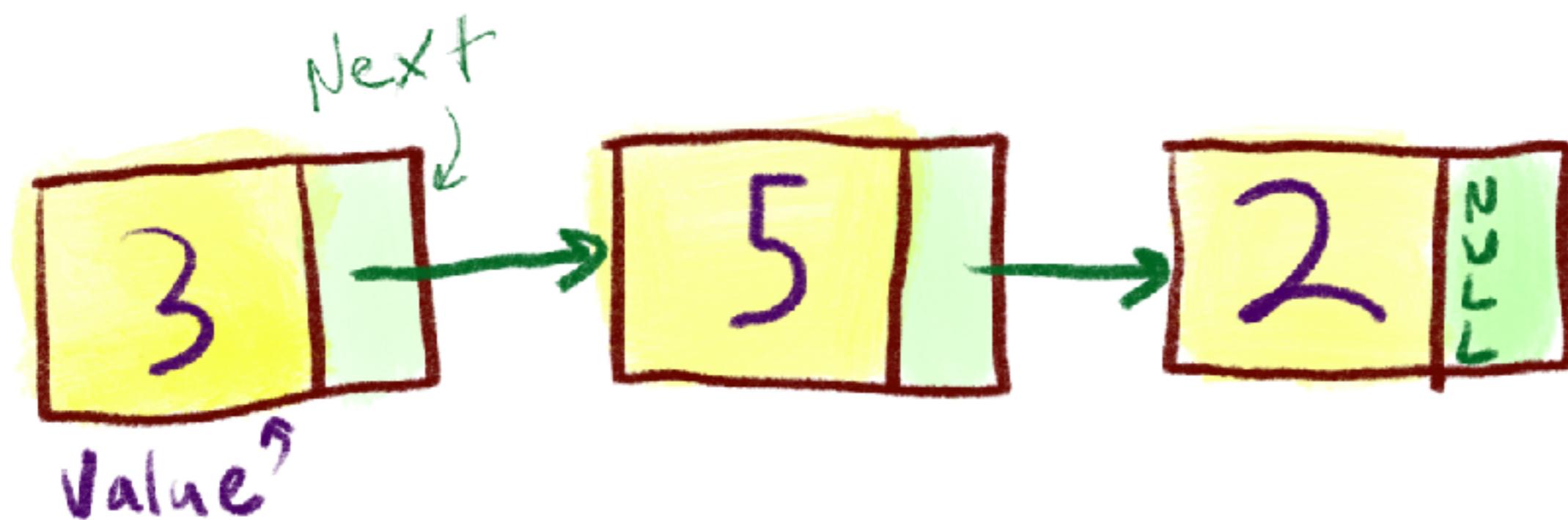
—Donald Knuth

Algorithms

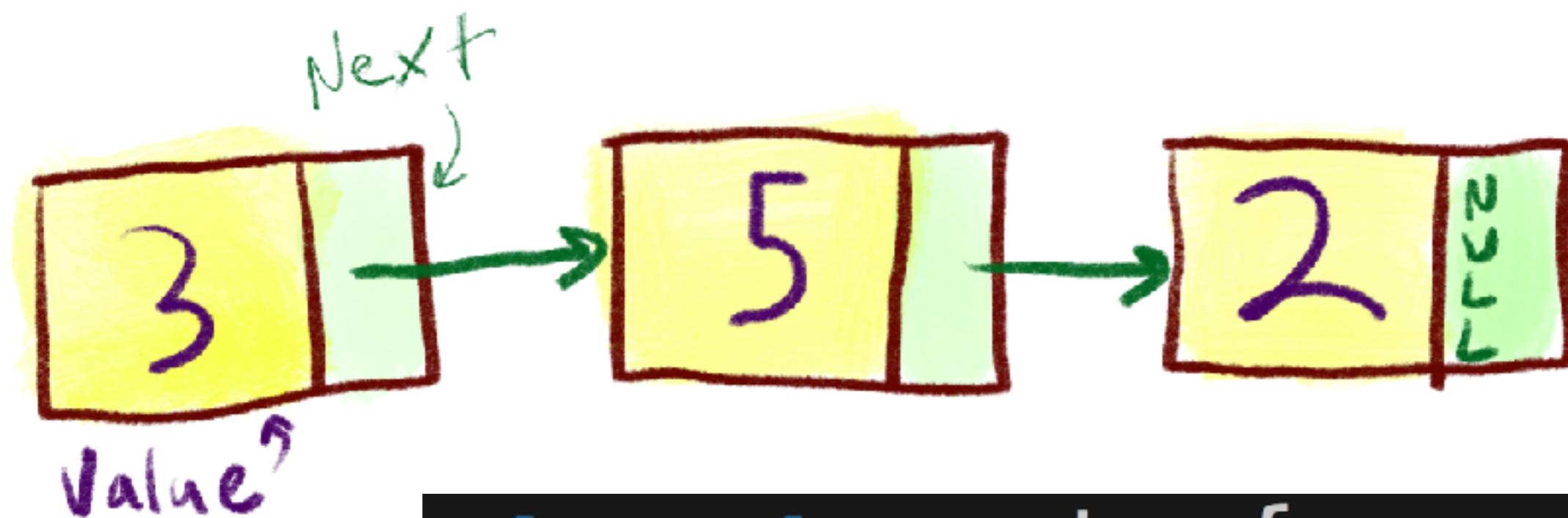


Data Structures

linked List

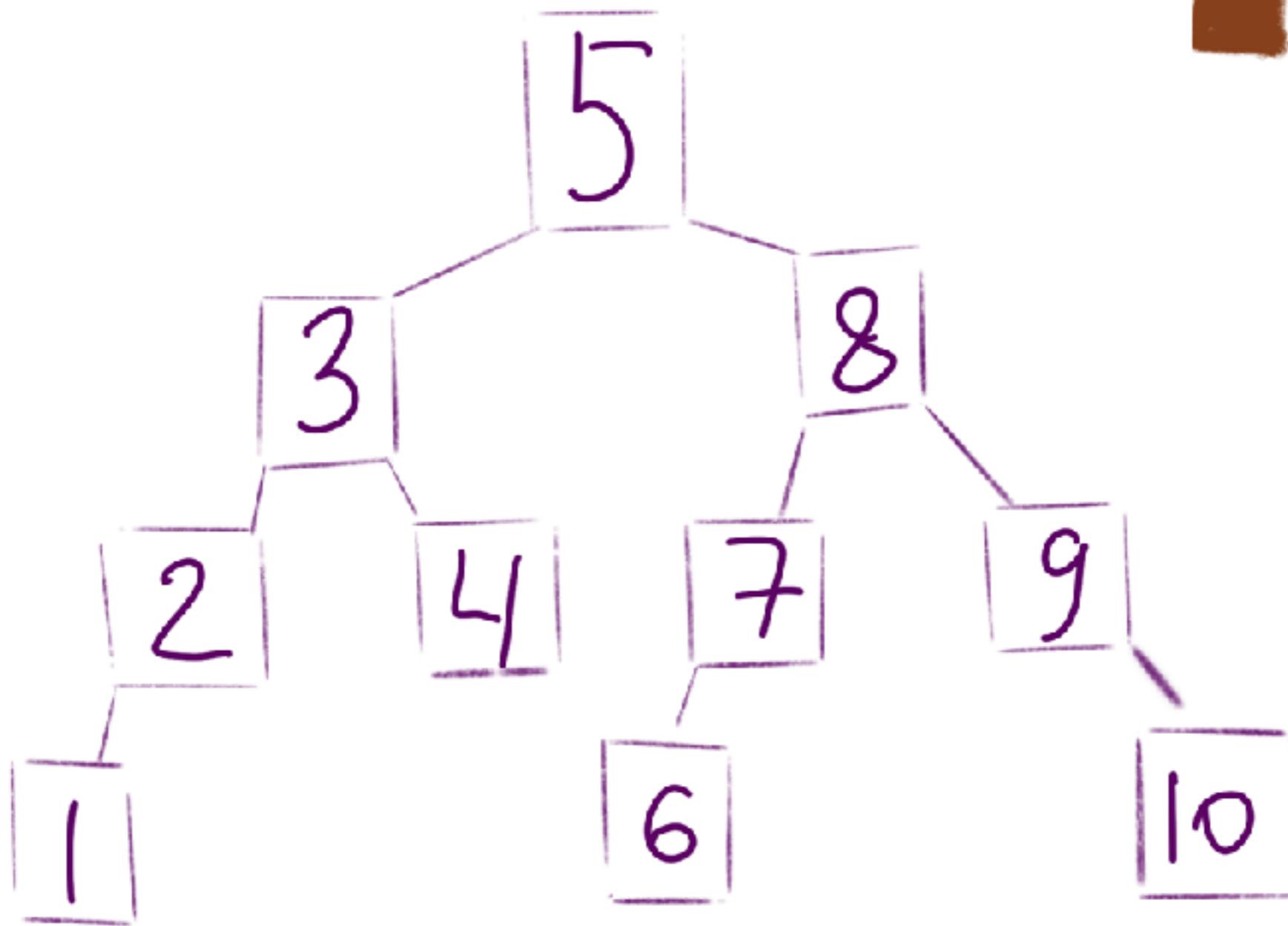


linked List



```
struct node {  
    int data;  
    struct node *next;  
};
```

Binary tree



Tradeoffs

Security

Fancy logos

PR

Clever names



Meltdown



Spectre

Security

- ❖ Don't trust input
- ❖ Principle of least privilege
- ❖ Understand cryptography

Security: User Input

- ❖ Don't trust user input

Security: Least Privilege

- ❖ Don't run things as root

Cryptography

- ❖ Hash Functions (one-way computation)
 - ❖ MD5
 - ❖ SHA-1
 - ❖ SHA-256
- ❖ Symmetric (encryption)
 - ❖ AES
- ❖ Asymmetric (public / private key)
 - ❖ Diffie-Hellman
 - ❖ RSA
 - ❖ Elliptic Curve

Hash Functions: Modulo Division

2 % 2 = 0

3 % 2 = 1

4 % 2 = 0

11 % 10 = 1

12 % 10 = 2

20 % 10 = 0

21 % 10 = 1

22 % 10 = 2

23 % 10 = 3

Hash Functions: SHA-1

```
$ echo "hello" | shasum  
f572d396fae9206628714fb2ce00f72e94f2258f
```

```
echo "hEllo" | shasum  
bee208903939e4d953d004aa592858abbd0dad7b
```

```
$ echo "my name is mischa" | shasum  
b0d56656e3aac8174f7c1d535f1421895af266de
```

Symmetric Cryptography

- ❖ Encrypt/decrypt stuff with a secret key
- ❖ AES-256 (Advanced Encryption Standard / Rijndael)

AES

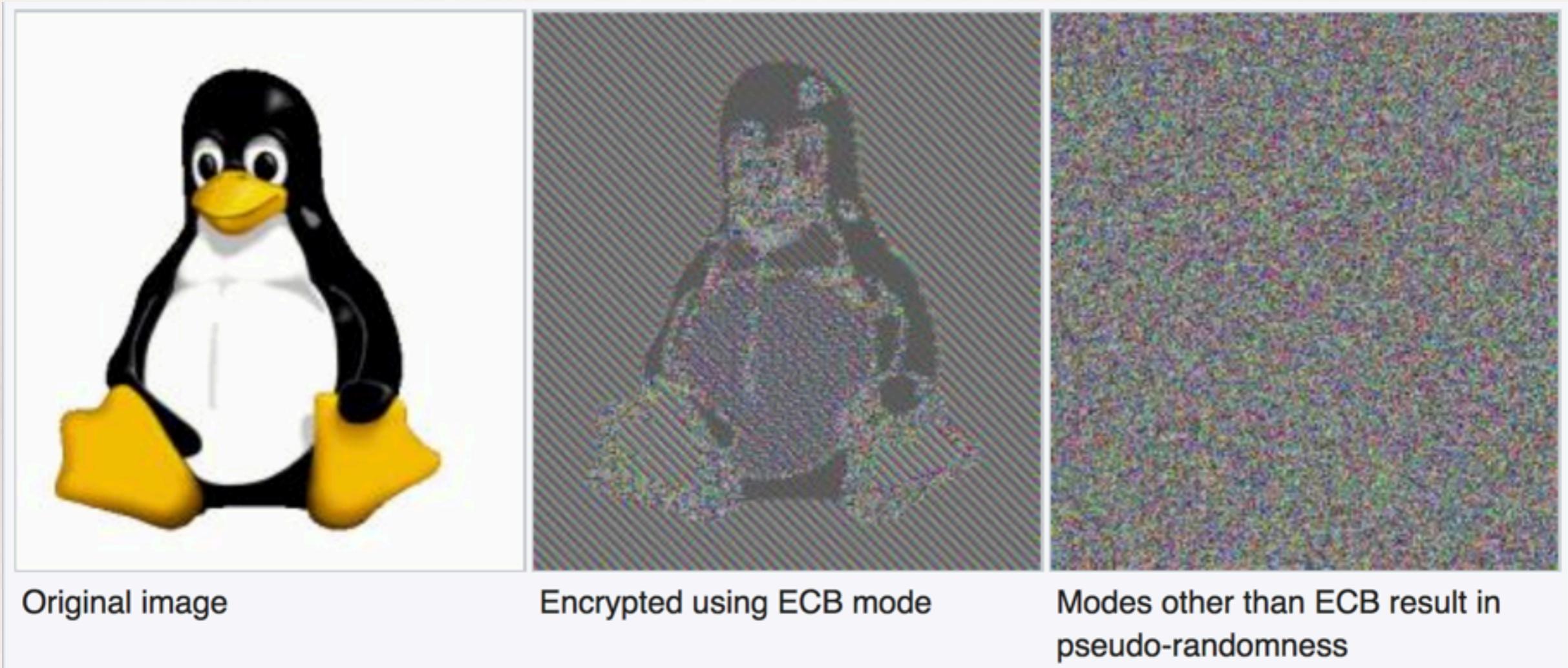
Message



encrypt & decrypt

Key

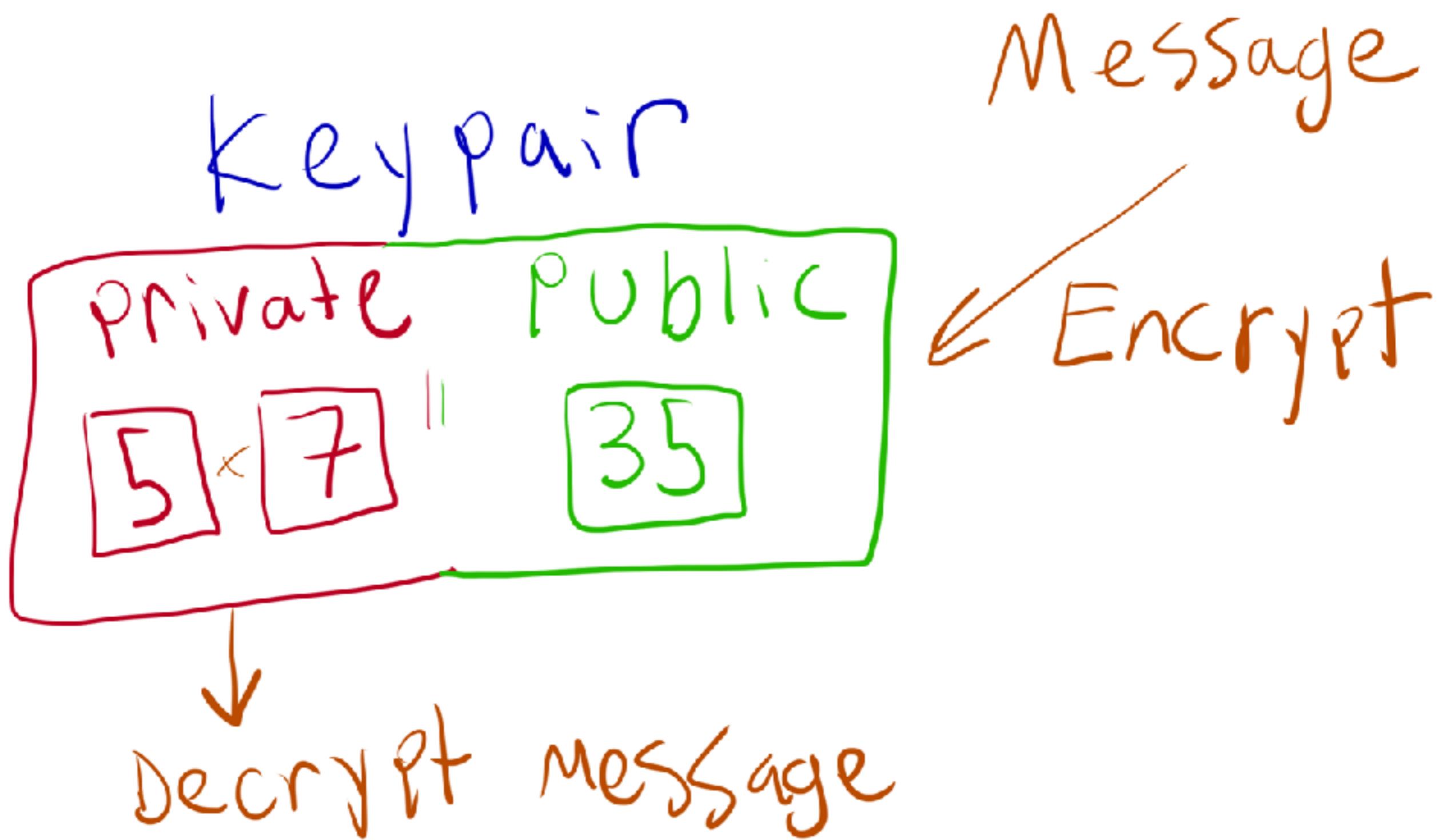
AES Cipher Block Modes



Asymmetric (Public/Private)

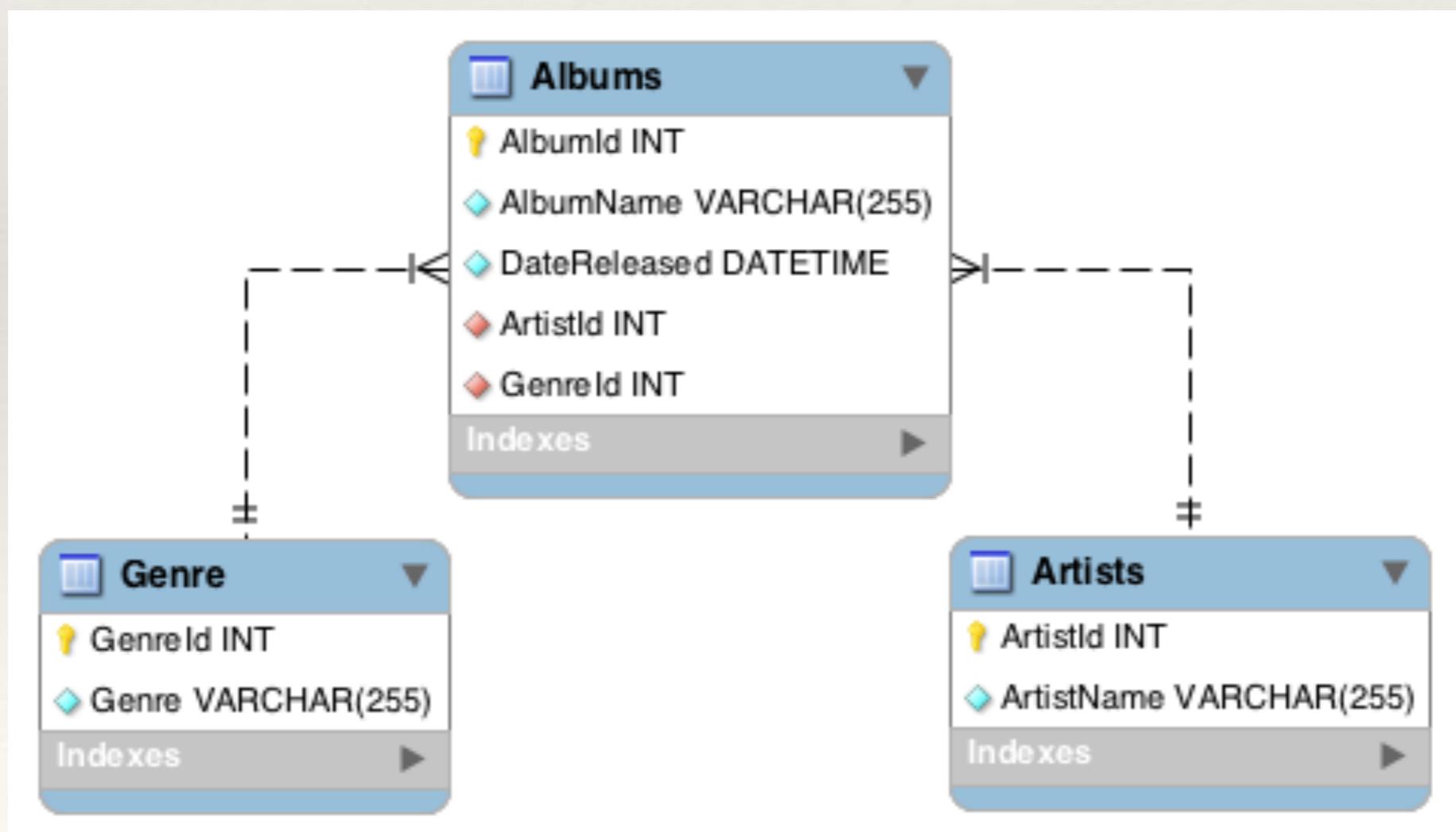
- ❖ Diffie-Hellman
- ❖ RSA
- ❖ Generate a **keypair** - public + private
- ❖ No pre-shared secrets needed
- ❖ HTTPS, SSH, GPG, Code Signing
- ❖ Authentication

RSA



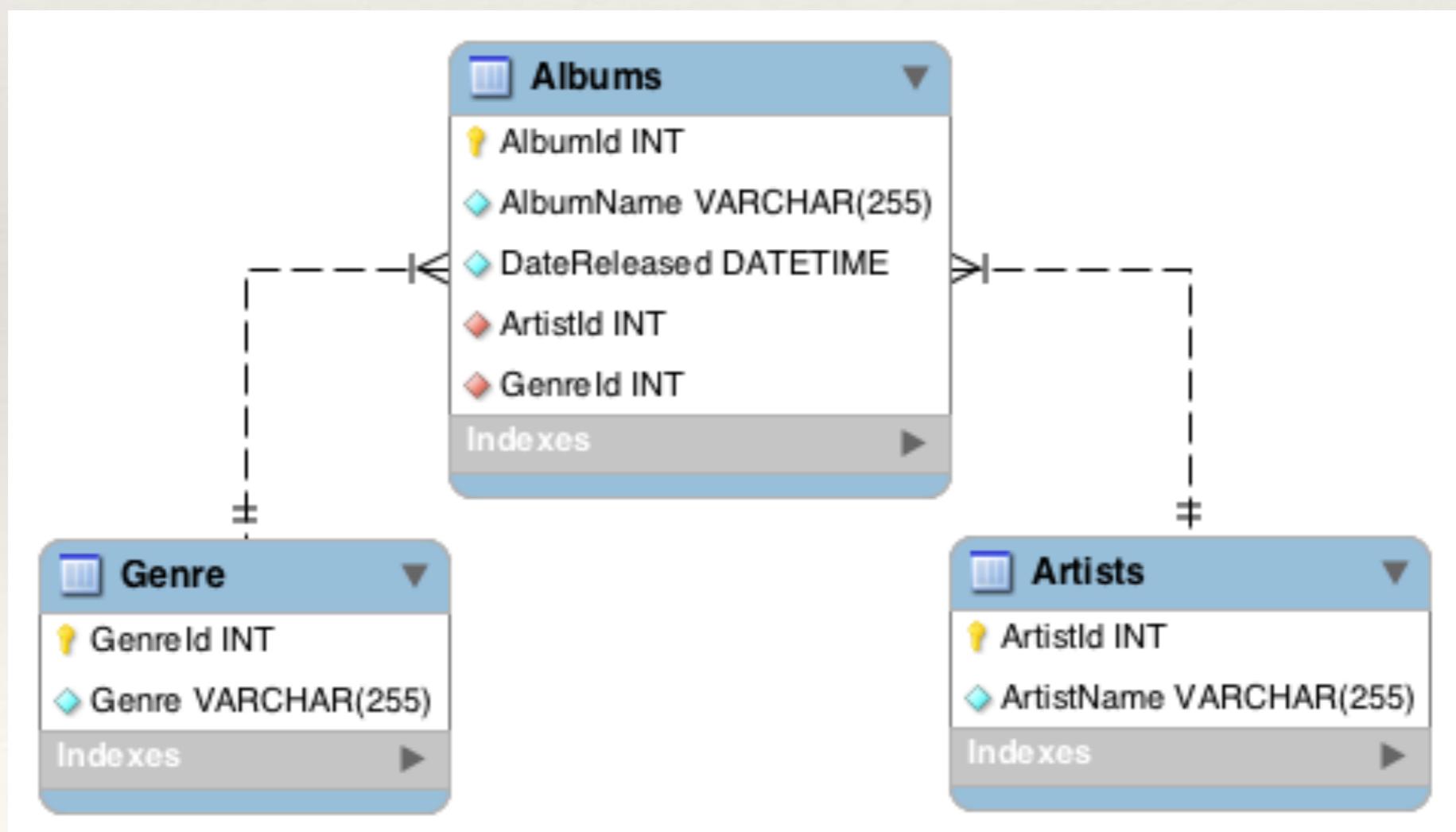
Databases

- ❖ Programmatic spreadsheets
- ❖ SQL - Structured Query Language



Databases

❖ **SELECT * FROM Albums**



Tables

Edit Data - localhost (:5432) - music - public.albums

The screenshot shows a database interface with a toolbar at the top containing icons for file operations, search, and help. The title bar reads "Edit Data - localhost (:5432) - music - public.albums". Below the toolbar is a table with the following data:

	id [PK] serial	album_name text	date_released date	artist_id integer	genre_id integer
1	1	The Doggfather	2006-01-01	2	1
2	2	Doggystyle	1993-01-01	2	1
3	3	Tha Last Meal	2001-01-01	2	1
4	4	The Chronic	1992-01-01	1	1
5	5	2001	2001-01-01	1	1
6	6	Compton	2005-01-01	1	1
7	7	Master Of Puppets	1986-01-01	3	2
8	8	...And Justice For All	1988-01-01	3	2
9	9	Ride The Lightning	1984-01-01	3	2
*					

❖ SELECT album_name FROM albums

```
cyber — 420 dank term — psql music — bash — 420term — 42x18
music=# SELECT album_name from albums;
          album_name
-----
The Chronic
2001
Compton
Doggystyle
Tha Last Meal
The Doggfather
Master Of Puppets
...And Justice For All
Ride The Lightning
(9 rows)

music=#

```

Table Schema

cyber — 420 dank term — more • psql music — bash — 420term — 105x22

Table "public.albums"

Column	Type	Collation	Nullable	
<code>id</code>	<code>integer</code>		<code>not null</code>	<code>nextval(</code>
<code>album_name</code>	<code>text</code>			
<code>date_released</code>	<code>timestamp with time zone</code>			
<code>artist_id</code>	<code>integer</code>			
<code>genre_id</code>	<code>integer</code>			

Indexes:

- "albums_pkey" PRIMARY KEY, btree (id)

Foreign-key constraints:

- "albums_artist_id_fkey" FOREIGN KEY (artist_id) REFERENCES artist(id)
- "albums_genre_id_fkey" FOREIGN KEY (genre_id) REFERENCES genre(id)

~

```
music=# \d artist
```

Table "public.artist"

Column	Type	Collation	Nullable	Default
<code>id</code>	<code>integer</code>		<code>not null</code>	<code>nextval('artist_id_seq')</code>
<code>artist_name</code>	<code>text</code>			

Indexes:

"artist_pkey" PRIMARY KEY, btree (id)

Referenced by:

TABLE "albums" CONSTRAINT "albums_artist_id_fkey" FOREIGN KEY (art



cyber — 420 dank term — psql music — bash — 420term — 101x19

```
music=# \d genre
```

Table "public.genre"

Column	Type	Collation	Nullable	Default
<code>id</code>	<code>integer</code>		<code>not null</code>	<code>nextval('genre_id_seq')::regclass</code>
<code>genre</code>	<code>text</code>			

Indexes:

"genre_pkey" PRIMARY KEY, btree (id)

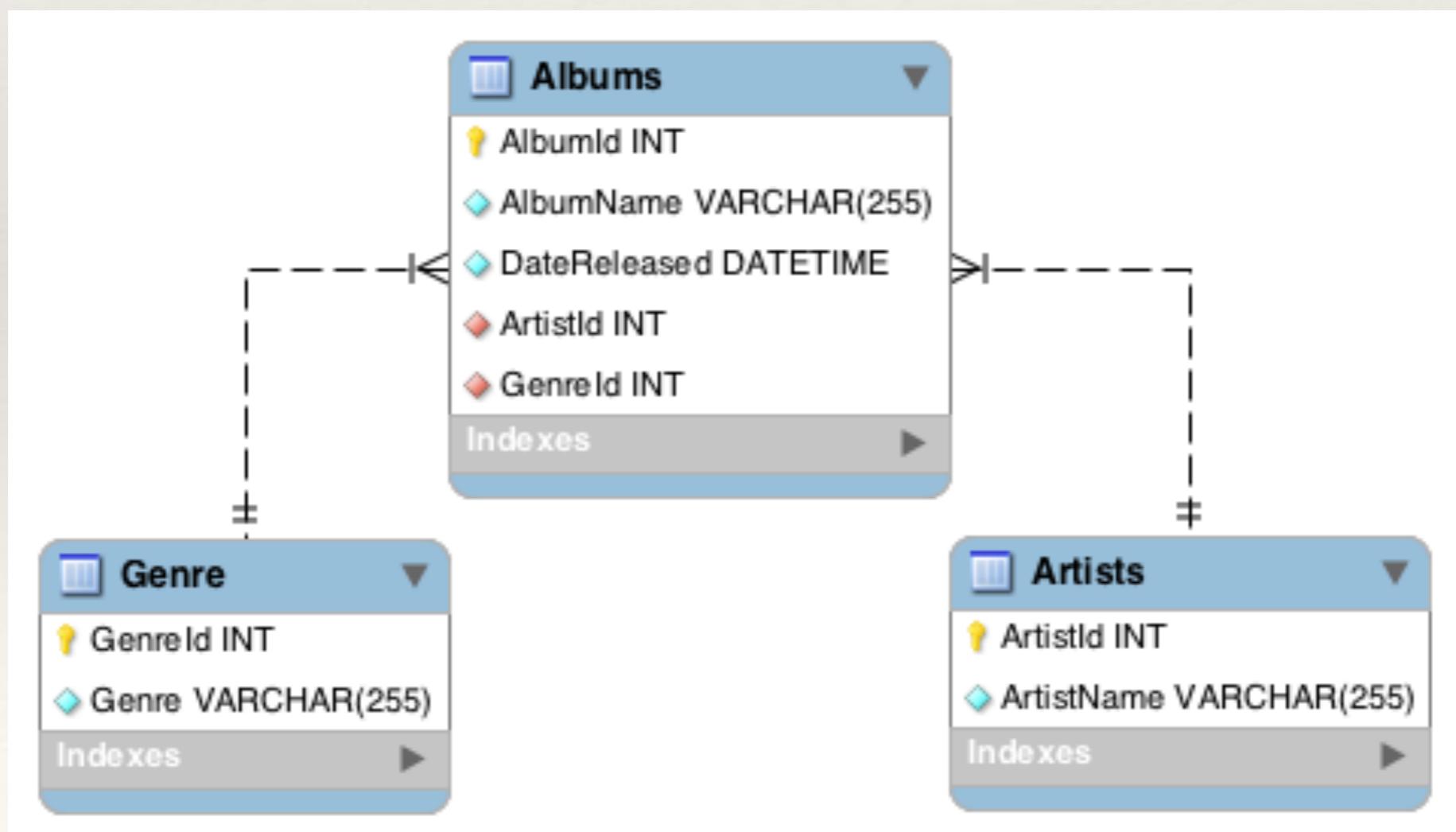
Referenced by:

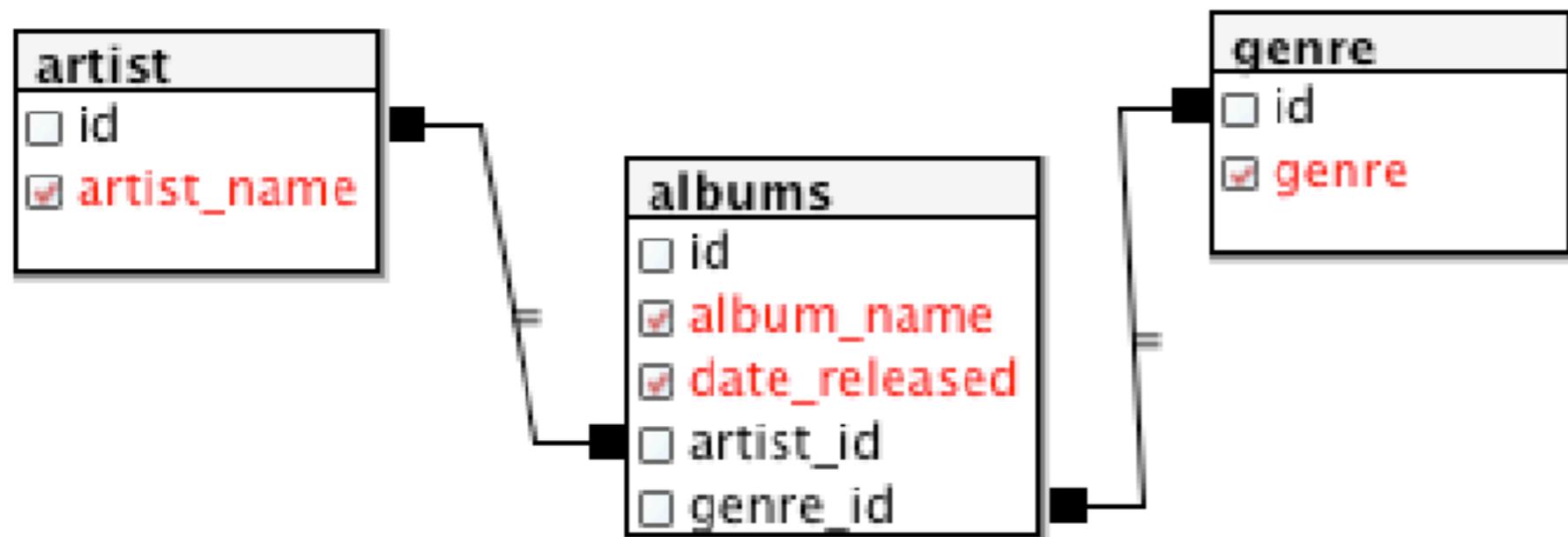
TABLE "albums" CONSTRAINT "albums_genre_id_fkey" FOREIGN KEY (genre_id

```
music#
```

Databases

- ❖ Programmatic spreadsheets
- ❖ SQL - Structured Query Language





Output pane

	album_name text	date_released date	genre text	artist_name text
1	Doggystyle	1993-01-01	rap	Snoop Dogg
2	Tha Last Meal	2001-01-01	rap	Snoop Dogg
3	The Doggfather	2006-01-01	rap	Snoop Dogg
4	The Chronic	1992-01-01	rap	Dr. Dre
5	2001	2001-01-01	rap	Dr. Dre
6	Compton	2005-01-01	rap	Dr. Dre
7	Master Of Puppets	1986-01-01	rock	Metallica
8	...And Justice For All	1988-01-01	rock	Metallica
9	Ride The Lightning	1984-01-01	rock	Metallica

INSERT

```
backend — 420 dank term — psql jetbridge — bash — 420term — 58x17
jetbridge=# INSERT INTO person (email, first_name) VALUES
('mischa.spiegelmock@jetbridge.com', 'Mischa');
INSERT 0 1
jetbridge=#

```

Statistics

```
d1cc2omb889d9h=> SELECT COUNT(*), city FROM tracking_event
GROUP BY city ORDER BY COUNT(*) DESC;
```

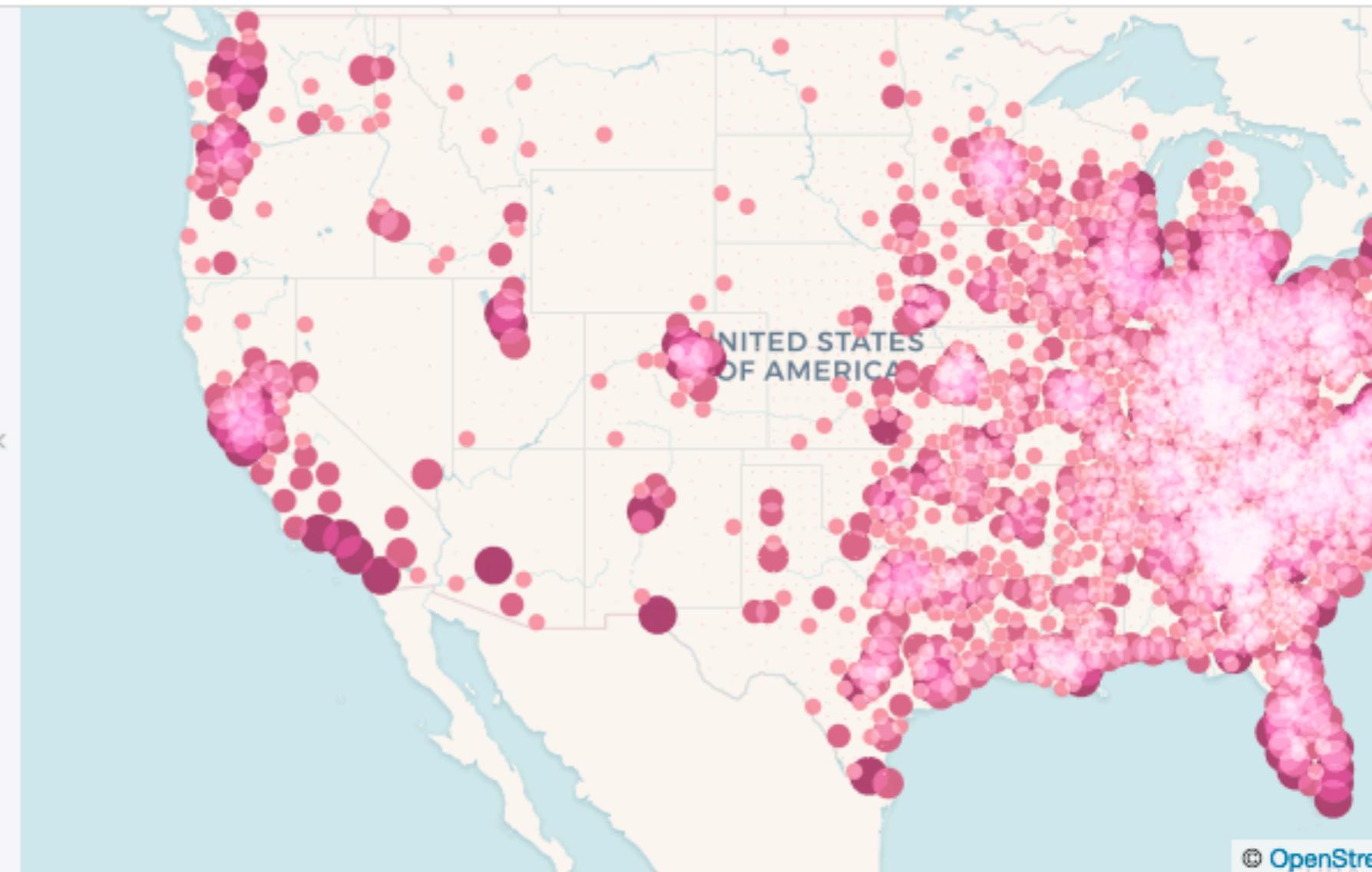
count	city
8903	Athens
6363	
1926	Kiev
1613	Mountain View
1320	Thessaloniki
941	New York
794	Berlin
740	Fort Worth
719	Munich
700	Sofia
515	Tregueux
490	San Francisco
486	Cambridge



PostgreSQL

```
SELECT "cartodb_id",
       st_centroid("the_geom_webmercator") AS "the_geom_webmercator",
       "name",
       "pop",
       "pop_sqkm",
       "created_at",
       "updated_at"
FROM "aromeu"."us_counties"
```

```
#layer['mapnik::geometry_type'=1] {
  marker-width: ramp([pop_sqkm],
range(1, 20), jenks(7));
  marker-fill: ramp([pop_sqkm],
(#ffc6c4, #ee919b, #cc607d, #9e3963,
#672044), jenks);
  marker-line-width: 0;
  marker-comp-op: screen;
  marker-fill-opacity: 0.9;
  marker-line-color: #FFFFFF;
  marker-line-opacity: 1;
  marker-type: ellipse;
  marker-allow-overlap: true;
}
```



Live Query Twitter

```
twitter=# select tag, count(*) as tag_count from  
tagstream group by tag order by tag_count desc limit 10;
```

tag	tag_count
Hiring	211
Job	165
CareerArc	163
Jobs	154
job	138
SanFrancisco	69
hirинг	60
FaceTimeMeNash	42

BOOLEAN Type

Since MySQL 5.0
MariaDB 5.1

```
CREATE TABLE ... (
```

... deleted BOOLEAN NOT NULL UNIQUE,

...

Alias for tinyint

```
INSERT ... (..., deleted, ...) VALUES (... , true, ...)
```

```
INSERT ... (..., deleted, ...) VALUES (... , false, ...)
```

```
INSERT ... (..., deleted, ...) VALUES (... , 42, ...)
```

de
1
0
42





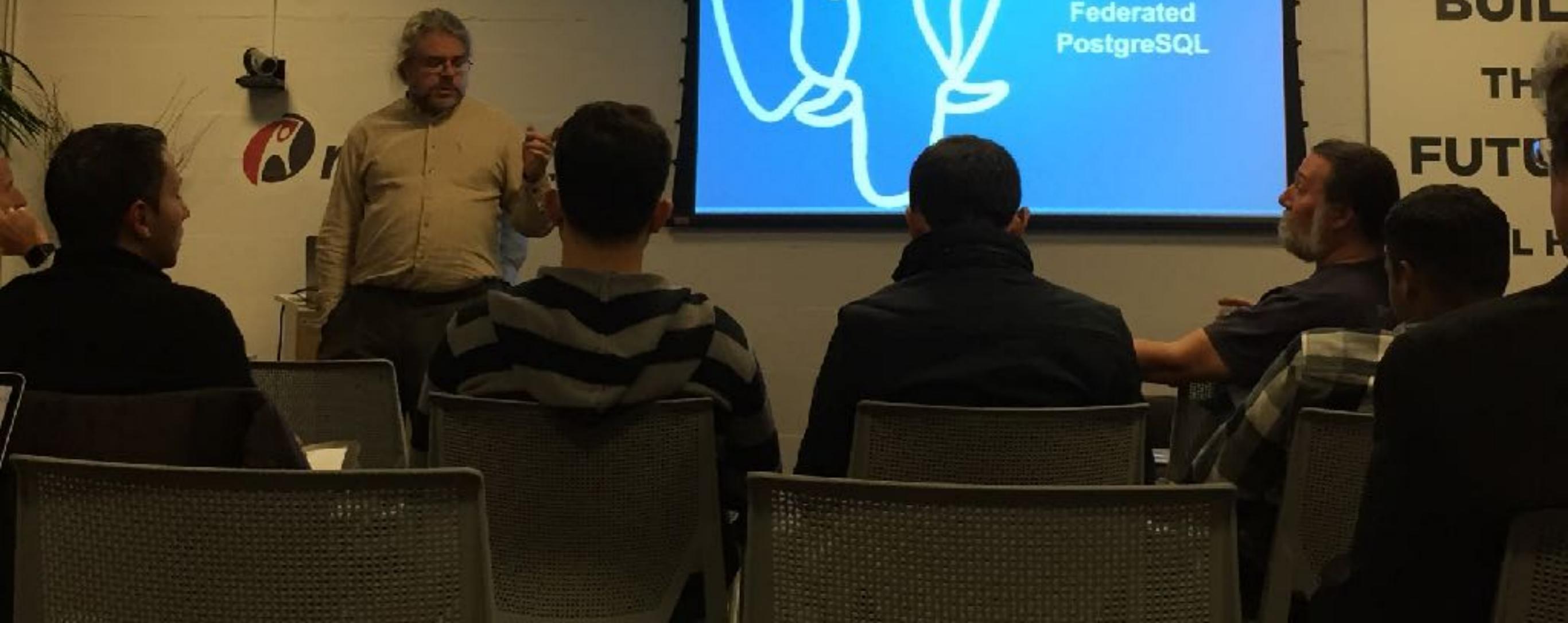
rockspace | ST

BUIL

TH

FUTU

L K



Version Control



“diffs” (differences)

```
diff --git a/src/components/pixel/event/tests/__fixtures__/nameEntered.js
b/src/components/pixel/event/tests/__fixtures__/nameEntered.js
index f27e7ccd..67bdb1cb 100644
--- a/src/components/pixel/event/tests/__fixtures__/nameEntered.js
+++ b/src/components/pixel/event/tests/__fixtures__/nameEntered.js
@@ -8,7 +8,7 @@ export default {
},
state: {
  nextEventKey: 2,
-  events: [{ name: 'a', key: 1 }],
+  events: [{ name: 'a', id: 1 }],
  newEventName: 'event name'
}
}
```

commits

```
commit d6bcddaaa786431176a22c31e6d1c6e25c55b773
Author: Mischa Spiegelmock <revmischa@cpn.org>
Date:   Sun Mar 11 08:32:27 2018 -0700
```

testing event create

```
diff --git a/src/components/pixel/event/tests/__fixtures__/nameEntered.js
b/src/components/pixel/event/tests/__fixtures__/nameEntered.js
index f27e7ccd..67bdb1cb 100644
--- a/src/components/pixel/event/tests/__fixtures__/nameEntered.js
+++ b/src/components/pixel/event/tests/__fixtures__/nameEntered.js
@@ -8,7 +8,7 @@ export default {
  },
  state: {
    nextEventKey: 2,
-    events: [{ name: 'a', key: 1 }],
+    events: [{ name: 'a', id: 1 }],
    newEventName: 'event name'
  }
}
```

commits

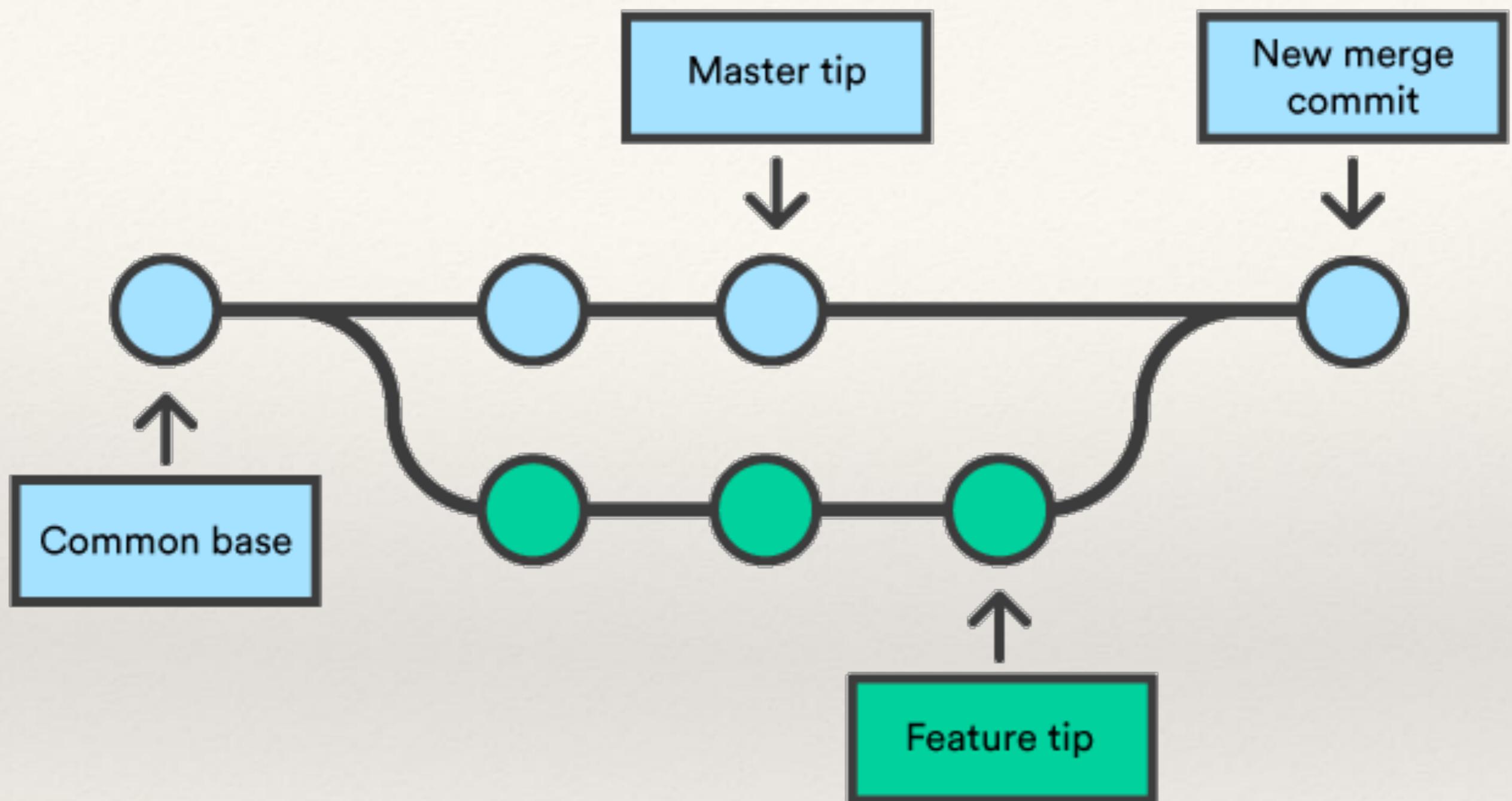
C C	■	@665	[665]	12/10/2007 11:32:17 AM	chuck	fuck this too
C C	■	@664	[664]	12/10/2007 11:28:50 AM	chuck	fuck all this too
C C	■	@663	[663]	12/10/2007 11:28:23 AM	chuck	fuck all this

git blame

 Intercom API and tests (#464)	6 months ago	308	
 Track sending of CRM BCC emails, and commit all se...	3 months ago	309	<code>def track_user_event(self, event_name, metadata=None, commit=True):</code>
 Export tracking events asynchronously (#533)	6 months ago	310	<code> """Record that an event happened for the current user."""</code>
 we should use 400 not 422 for most API errors. (#627)	6 months ago	311	<code> if self.is_testing():</code>
		312	<code> return</code>
 User active tracking enhancements (#794)	4 months ago	313	
		314	<code> if metadata is None:</code>
		315	<code> metadata = {}</code>
		316	<code> metadata['last_seen_ip'] = request.remote_addr</code>
 Fix login	4 months ago	317	<code> metadata['last_seen_user_agent'] = str(request.user_agent)</code>
 Track sending of CRM BCC emails, and commit all se...	3 months ago	318	
		319	<code> return current_user.track_event(</code>
 Intercom event tracking (#491)	7 months ago	320	<code> event_name=event_name,</code>
		321	<code> metadata=metadata,</code>
 Track sending of CRM BCC emails, and commit all se...	3 months ago	322	<code> commit=commit</code>
 Intercom event tracking (#491)	7 months ago	323	<code>)</code>
		324	
 Twilio basic support (#737)	4 months ago	325	<code>def twilio_client(self):</code>
		326	<code> """Return a configured twilio client."""</code>
		327	<code> from jetbridge.telephony.twilio import JBTwilio</code>
 Call history (#787)	4 months ago	328	<code> # singleton</code>
		329	<code> if not hasattr(self, '_twilio_client'):</code>
 Telephony reminders (#820)	3 months ago	330	<code> setattr(self, '_twilio_client', JBTwilio(app=self))</code>
 Call history (#787)	4 months ago	331	<code> return getattr(self, '_twilio_client')</code>
 Twilio basic support (#737)	4 months ago	332	
		333	<code>def api_load_schema(self, schema: Schema, params: dict=None):</code>
 Intercom API and tests (#464)	6 months ago	334	<code> """Deserialize JSON request body using a marshmallow schema.</code>



git





GitHub

Pull Requests

<> Code ! Issues 11 Pull requests 2 Projects 0 Wiki Insights Settings

BSD support #37

Edit

Open revmischa wants to merge 10 commits into master from bsd

Conversation 0

Commits 10

Files changed 14

+55 -62



revmischa commented 5 hours ago

Owner



Reviewers



No reviews—request one

Testing building on FreeBSD 11.

Basically just changing `_linux_` to `_unix_`

Re: #36

Assignees



revmischa

revmischa added some commits 4 days ago

Labels



qt autoconf

✓ a82dae3 None yet

WIP: Qt5 makefile

✓ aaa4456

go away cmake

✓ 1392d5e None yet

testing bsd define

✓ 5480f29

readme

26b5075 Milestone



Pull Requests

8 src/libprojectM/Common.hpp

Show comments

View

```
@@ -61,7 +61,7 @@ extern FILE *fmemopen(void *buf, size_t len, const char *pMode);  
61      61      #define STRING_LINE_SIZE 1024  
62      62  
63      63  
64      -#ifdef __linux__  
64      +#ifdef __unix__
```

[Write](#) | [Preview](#)

AA B i “ < > Ⓜ

this is stupid everyone uses linux BSD is dead!

Attach files by dragging & dropping, [selecting them](#), or pasting from the clipboard.

Styling with Markdown is supported

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```
65    65    #include <cstdlib>
66    66    #define projectM_isnan std::isnan
67    67    #endif
```

Add link and screenshot to Silverjuke, an FOSS jukebox which is also ... #31

Merged revmischa merged 1 commit into projectM-visualizer:master from r10s:master 23 days ago

Conversation 5 Commits 1 Files changed 2

r10s commented 23 days ago

...proudly using projectM :)

Add link and screenshot to Silverjuke, an FOSS jukebox which is also b10e5ce

revmischa commented 23 days ago

great! 👍

revmischa merged commit 9b77c8a into projectM-visualizer:master 23 days ago

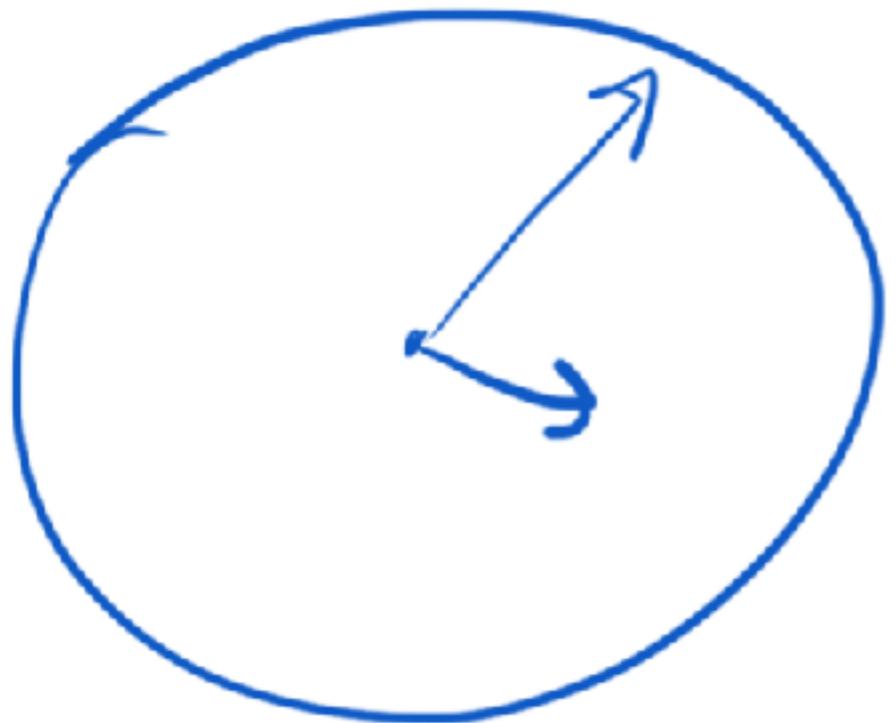
1 check passed

View details Revert

r10s commented 23 days ago

thank you - also for your great visualization :)

Skills



~ 15 %

Writing code

Time Estimates

Time Estimates

Always wrong

Time Estimates

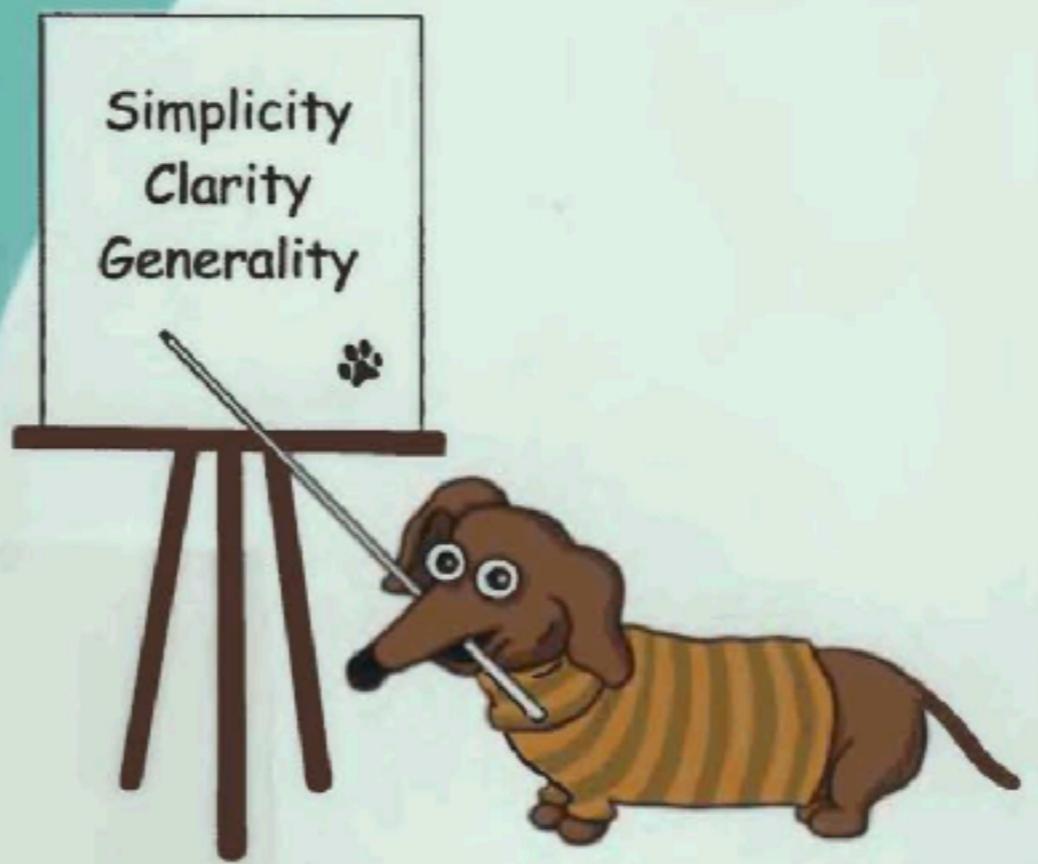




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Rob Pike



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- ❖ Get hired
- ❖ Network
- ❖ Hackerspaces



Start Your Own!



Chat

❖ IRC

❖ Slack

e"s;\\${PREFIX};\$PREFIX;" /tmp/what; cat /tmp/what
22:52 **snb** 🧑 when i put a space in between the -i and "" i end up with "/usr/local \$PREFIX"
/tmp/what
22:52 **Cyber Mischa** 🇺🇦 if i do
AC_CONFIG_FILES([src/libprojectM/config.inp], [sed -i "" -e"s;\\${PREFIX};\$PREFIX;"
src/libprojectM/config.inp])
it stops bitching but it only does:
22:52 **avi** my sed hates that -i "" shit
22:52 **Cyber Mischa** 🇺🇦 presets # preset location
@avi i did
\$ export PREFIX="/usr/local/"; echo '\${PREFIX} \$PREFIX' > /tmp/w
hat; sed -i"" -e"s;\\${PREFIX};\$PREFIX;" /tmp/what
sed: -i may not be used with stdin
22:52 **snb** 🧑 mischa i think it needs a space between -i and ""
22:52 **Cyber Mischa** 🇺🇦 Preset Path = /share/presets # preset location
is what i get with -i ""
theres a space
22:53 **snb** 🧑 not in what you pasted there isn't
22:53 **avi** if you put a space it fucks on gnu
22:53 **snb** 🧑 ya bsd sed is gross

IRC: freenode

- ❖ irc.freenode.net
- ❖ #postgresql
- ❖ #c
- ❖ #docker
- ❖ #ubuntu
- ❖ #anime
- ❖ ##politics

Conferences



BEER
TASTING



Python geospatial packages

Interfaces to widely used libraries:

- Python bindings to GDAL/OGR (`from osgeo import gdal, ogr`)
- Python interface to PROJ.4: [pyproj](#)
- Pythonic binding to GDAL/OGR:
 - GDAL: [rasterio](#)
 - OGR: [fiona](#)
- Python package based on GEOS: [shapely](#)

12 / 12

PIP INSTALL AXELROD

PRISONERS' DILEMMA

WHEN INTERACTING WITH A
SNEAKY OPPONENT
SHOULD PEOPLE HOLD A GRUDGE
AGAINST THEM?

	1	2	3	4	5	6
SneakyTitForTat	C	C	D	D	C	C
Grudger	C	C	C	D	D	D

```
>>> import axelrod as axl

>>> first_match = axl.Match([
...     axl.SneakyTitForTat(),
...     axl.Grudger(),
...     turns=10])

>>> first_match.play()[:]
[(C, C), (C, D), (D, C),
 (D, D), (C, D), (D, C),
 (D, D), (C, D), (D, C),
 (D, D), (C, D)]

>>> first_match.final_score()
(C, 0)

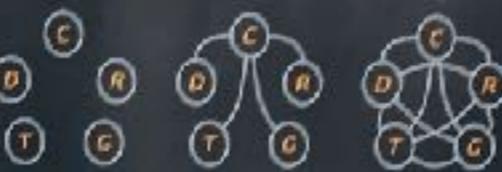
>>> second_match = axl.Match([
...     axl.SneakyTitForTat(),
...     axl.TitForTat(),
...     turns=10])

>>> _ = second_match.play()
>>> second_match.final_score()
(D, 0)

>>> assert axl._version == "2.0.0"
# Python 3 doctests ported to
# 2 expected failures for readability
```

- both sides are better off **Cooperating** (3)
- there is always a temptation to **Defect** (5)

WHAT IS THE OPTIMAL STRATEGIC
PLAY AGAINST THE MANY FACES OF
WAR?



```
>>> import axelrod as axl

>>> axl.seed()
>>> players = [axl.Cooperator(), axl.Random(),
...             axl.TitForTat(), axl.Grudger(),
...             axl.Defector()]

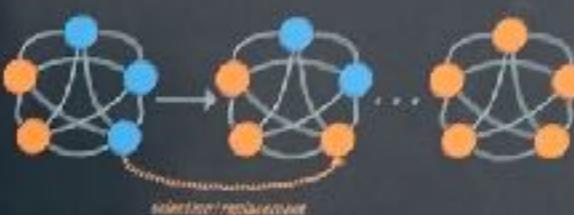
>>> tournament = axl.Tournament(players)
>>> results = tournament.play()
>>> results.ranked_names
['Grudger', 'Defector', 'Tit For Tat',
 'Cooperator', 'Random: 0.5']

>>> plot = axl.Plot(results)
>>> p = plot.boxplot()
>>> p.show()
```



C	3	5
C	3	0
D	5	1

SHOULD THE NORTH JOIN HANDS
WITH THE SOUTH TO DEFEAT THE
NIGHT KING?



```
>>> import axelrod as axl
>>> import random

>>> N = 10
>>> players = []
>>> axl.seed()
>>> for _ in range(N):
...     player = random.choice([axl.Defector,
...                            axl.Cooperator])
...     players.append(player)

>>> np = axl.NormanProcess(players=players, turns=10)
>>> np.play()
[Counter({'Cooperator': 10, 'Defector': 0}),
 Counter({'Cooperator': 9, 'Defector': 1}),
 Counter({'Cooperator': 8, 'Defector': 2}),
 Counter({'Cooperator': 7, 'Defector': 3}),
 Counter({'Cooperator': 6, 'Defector': 4}),
 Counter({'Cooperator': 5, 'Defector': 5}),
 Counter({'Cooperator': 4, 'Defector': 6}),
 Counter({'Cooperator': 3, 'Defector': 7}),
 Counter({'Cooperator': 2, 'Defector': 8}),
 Counter({'Cooperator': 1, 'Defector': 9}]

>>> np.stats()
{'Cooperator': 1.0, 'Defector': 0.0}
```



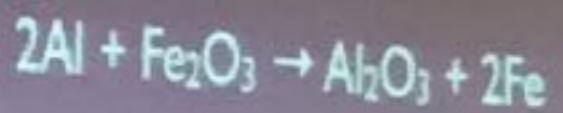
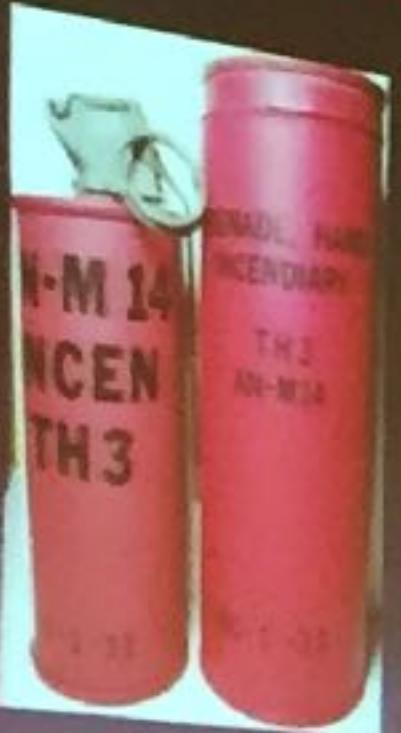
© NikolaetaGlyn

In case you missed my [github](https://github.com/Nikolaeta-v3/blog/2017/08/23/grudger-vs-go.html), in [Blog](https://github.com/Nikolaeta-v3/blog/2017/08/23/grudger-vs-go.html)

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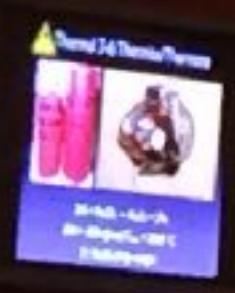


Thermal 3-6: Thermite/Thermate



$$\Delta H = -850 \text{ kJ/mol}, T_{\max} = 2500^\circ\text{C}$$

3:1 Fe₂O₃:Al by weight





JAKESBOX
HONEY



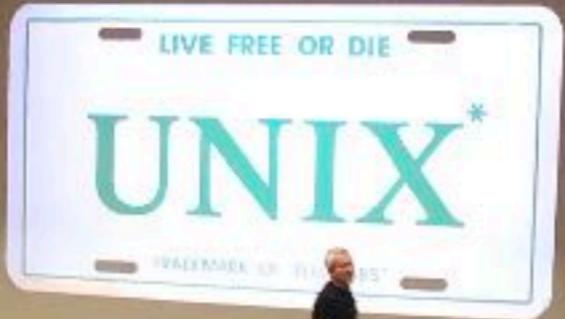
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GStreamer: state of the union

The annual [GStreamer conference](#) took place October 21-22 in Prague, (unofficially) co-located with the [Embedded Linux Conference Europe](#). The [GStreamer](#) project is a library for connecting media elements such as sources, encoders and decoders, filters, streaming endpoints, and output sinks of all sorts into a fully customizable pipeline. It offers cross-platform support, a large set of plugins, modern streaming and codec formats, and hardware acceleration as some of its [features](#).

Kicking off this year's conference was Tim-Philipp Müller with his report on the last 12 months of development and what we can look forward to next.

The core team has been sticking to a more or less six-month release schedule, adjusted somewhat for other timelines. The project is aiming to land the next 1.14 release enough ahead of the Ubuntu 18.04 long-term support version so that for the next few years there is a relatively recent version for developers to base their work on.

Project components

There is a [system of categorization](#) (worth a read for the amusing descriptions) for plugins based on the film *The Good, the Bad and the Ugly*. These plugins comprise most of the useful functionality of GStreamer. "gst-plugins-good" is made up of plugins with solid documentation, tests, and well-written code that should be used as examples for writing new plugins. "gst-plugins-ugly" is similar in quality to "good" but may pose distribution issues because of patents or licenses. "bad" is for all the rest that are of varying quality, perhaps not well documented, or not recommended for production use and to base new plugins on.

There is an ongoing mission in the GStreamer project to consolidate the platform by trying to promote plugins and pieces of code from the "bad" repository into "good" by fixing whatever may be at issue. There is now an effort to clearly document why a plugin remains in the "bad" category so that contributors know what needs to be fixed and maintainers can remember why a plugin was considered unfit

October 30, 2017

This article was contributed by Mischa Spiegelmock

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