Motivation and pre-requisites

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About this course

- This course covers the basic ideas behind getting data ready for analysis
- Finding and extracting raw data
- Tidy data principles and how to make data tidy
- Practical implementation through a range of R packages
- What this course depends on
- The Data Scientist's Toolbox
- R Programming
- What would be useful
- Exploratory analysis
- Reporting Data and Reproducible Research

What you wish data looked like

solutions-jun3.csv

id	problem_id	subject_id	start	stop	time_left	answer
1	498	17	1307119989	1307120016	2369	A
2	150	15	1307119991	1307120009	2376	D
3	313	16	1307119994	1307120009	2376	E
4	12	13	1307119995	1307120019	2366	B
5	273	14	1307119996	1307120028	2357	A
6	101	19	1307119996	1307120021	2364	B
7	105	18	1307119998	1307120048	2337	B
8	162	12	1307120004	1307120042	2343	C
9	70	15	1307120011	1307120038	2347	C
10	300	16	1307120012	1307120092	2293	B
11	494	17	1307120017	1307120075	2310	D
12	357	13	1307120021	1307120118	2267	A
13	522	19	1307120025	1307120152	2233	D
14	232	14	1307120030	1307120158	2227	C
15	344	15	1307120041	1307120117	2268	B
16	160	17	1307120079	1307120249	2136	D
17	516	16	1307120094	1307120159	2226	B
18	472	12	1307120119	1307120170	2215	A
19	43	15	1307120122	1307120140	2245	C
20	353	13	1307120144	1307120199	2186	C
21	218	15	1307120152	1307120272	2113	E
22	69	16	1307120163	1307120188	2197	D
23	562	16	1307120190	1307120301	2084	D
24	121	19	1307120253	1307120294	2091	E
25	297	15	1307120277	1307120342	2043	B
26	495	13	1307120281	1307120353	2032	E
27	94	14	1307120288	1307120343	2042	E
28	22	18	1307120310	1307120365	2020	C
29	64	19	1307120310	1307120385	2000	B
30	502	16	1307120323	1307120336	2049	B
31	44	16	1307120339	1307120352	2033	A
32	315	14	1307120348	1307120362	2023	B
33	385	15	1307120352	1307120553	1832	E
34	550	13	1307120356	1307120444	1941	B
35	92	14	1307120368	1307120397	1988	B
36	395	16	1307120377	1307120426	1959	D
37	267	17	1307120382	1307120515	1870	E
38	257	14	1307120401	1307120427	1958	C
39	312	19	1307120407	1307120548	1837	D
40	321	18	1307120431	1307120449	1936	A
41	220	16	1307120437	1307120510	1875	A

What does data really look like?

```
@HWI-EAS121:4:100:1783:550#0/1
CGTTACGAGATCGGAAGAGCGGTTCAGCAGGAATGCCGAGACGGATCTCGTATGCGGTCTGCTGCGTGACAAGACAGGGG
+HWI-EAS121:4:100:1783:550#0/1
aaaaa`b_aa`aa`YaX]aZ`aZM^Z]YRa]YSG[[ZREQLHESDHNDDHNMEEDDMPENITKFLFEEDDDHEJQMEDDD
@HWI-EAS121:4:100:1783:1611#0/1
GGGTGGGCATTTCCACTCGCAGTATGGGTTGCCGCACGACAGGCAGCGGTCAGCCTGCGCTTTGGCCTGGCCTTCGGAAA
+HWI-EAS121:4:100:1783:1611#0/1
a```^\__`_```^a``a`^a_^__]a_]\]`a______`_^^`]X]_]XTV_\]]NX_XVX]]_TTTTG[VTHPN]VFDZ
@HWI-EAS121:4:100:1783:322#0/1
CGTTTATGTTTTTGAATATGTCTTATCTTAACGGTTATATTTTAGATGTTGGTCTTATTCTAACGGTCATATATTTTCTA
+HWI-EAS121:4:100:1783:322#0/1
abaa`^aaaaabbbaababbbbbb`bbbb_bbbbbbbb`bbbaV^_a``a``]``aT]a__V\]]_]^a`]a_abbaV__
@HWI-EAS121:4:100:1783:1394#0/1
GGGTCTTTATTGGTCTGGTGATCCCCCATATTCTCCGGTTGTGTGGTTTAACCGATCATCGCGCATTACTTCCCGGCTGC
+HWI-EAS121:4:100:1783:1394#0/1
```[aa\b^^[]aabbb][`a_abbb`a``bbbbbabaabaaaab_VZa_^___bab_X`[a\HV_[_]_[^_X\T_VQQ
@HWI-EAS121:4:100:1783:207#0/1
CCCTGGGAGATCGGAAGAGCGGTTCAGCAGGAATGCCGAGACCGATCTCGTATGCCGTCTTCTGCTTGAAAAAAAAACA
+HWI-EAS121:4:100:1783:207#0/1
abba`Xa\^\\`aa]ba__bba[a_O_a`aa`aa`a]^V]X_a^YS\R_\H_[]\ZTDUZZUSOPX]]POP\GS\WSHHD
@HWI-EAS121:4:100:1783:455#0/1
GGGTAATTCAGGGACAATGTAATGGCTGCACAAAAAAATACATCTTTCATGTTCCATTGCACCATTGACAAATACATATT
+HWI-EAS121:4:100:1783:455#0/1
abb_babbabaabbbbbbbbbbbbbbba\`b`\abbbabbbbabbbbbbaabbbbb`bb`ab_O_bab_Q_bbabaa_a
```

http://brianknaus.com/software/srtoolbox/s_4_1_sequence80.txt
```

What does data really look like?

GET blocks/blocking | Twitt

https://dev.twitter.com/docs/api/1/get/blocks/blocking

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cursor to be -1 if it isn't supplied.

Example Values: 12893764510938

Example Request

GET https://api.twitter.com/1/blocks/blocking.json?cusor=-1&include_entities=true


```
1. {
2.   "previous_cursor": 0,
3.   "previous_cursor_str": "0",
4.   "next_cursor": 0,
5.   "users": [
6.     {
7.       "profile_sidebar_border_color": "C0DEED",
8.       "name": "Javier Heady \r",
9.       "profile_sidebar_fill_color": "DDEEF6",
10.      "profile_background_tile": false,
11.      "location": null,
12.      "created_at": "Thu Mar 01 00:16:47 +0000 2012",
13.      "profile_image_url":
    "http://a0.twimg.com/sticky/default_profile_images/default_profile_4_normal.png",
14.      "is_translator": false,
15.      "id_str": "509466276",
16.      "profile_link_color": "0084B4",
17.      "follow_request_sent": false,
18.      "contributors_enabled": false,
19.      "default_profile": true,
20.      "url": null,
21.      "favourites_count": 0,
22.      "utc_offset": null,
23.      "id": 509466276,
24.      "profile_image_url_https":
    "https://si0.twimg.com/sticky/default_profile_images/default_profile_4_normal.png",
25.      "listed_count": 0,
26.      "profile_use_background_image": true,
27.      "profile_text_color": "333333",
28.      "lang": "en",
29.      "protected": false,
30.      "followers_count": 0,
31.      "geo_enabled": false,
32.      "description": null,
```


https://dev.twitter.com/docs/api/1/get/blocks/blocking

What does data really look like?

```
--------------------------  ALLERGIES  -------------------------

ast Updated: 01 Dec 2011 @ 0851

llergy Name:        TRIMETHOPRIM
ocation:            DAYT29
ate Entered:        09 Mar 2011
eaction:
llergy Type:        DRUG
A Drug Class:       ANTI-INFECTIVES,OTHER
bserved/Historical: HISTORICAL
omments:            The reaction to this allergy was MILD (NO SQUELAE)

llergy Name:        TRAMADOL
ocation:            DAYT29
ate Entered:        09 Mar 2011
eaction:            URINARY RETENTION
llergy Type:        DRUG
A Drug Class:       NON-OPIOID ANALGESICS
bserved/Historical: HISTORICAL
omments:            gradually worsening difficulty emptying bladder
```

```
--------------------------  MEDICATION HISTORY  ---------------

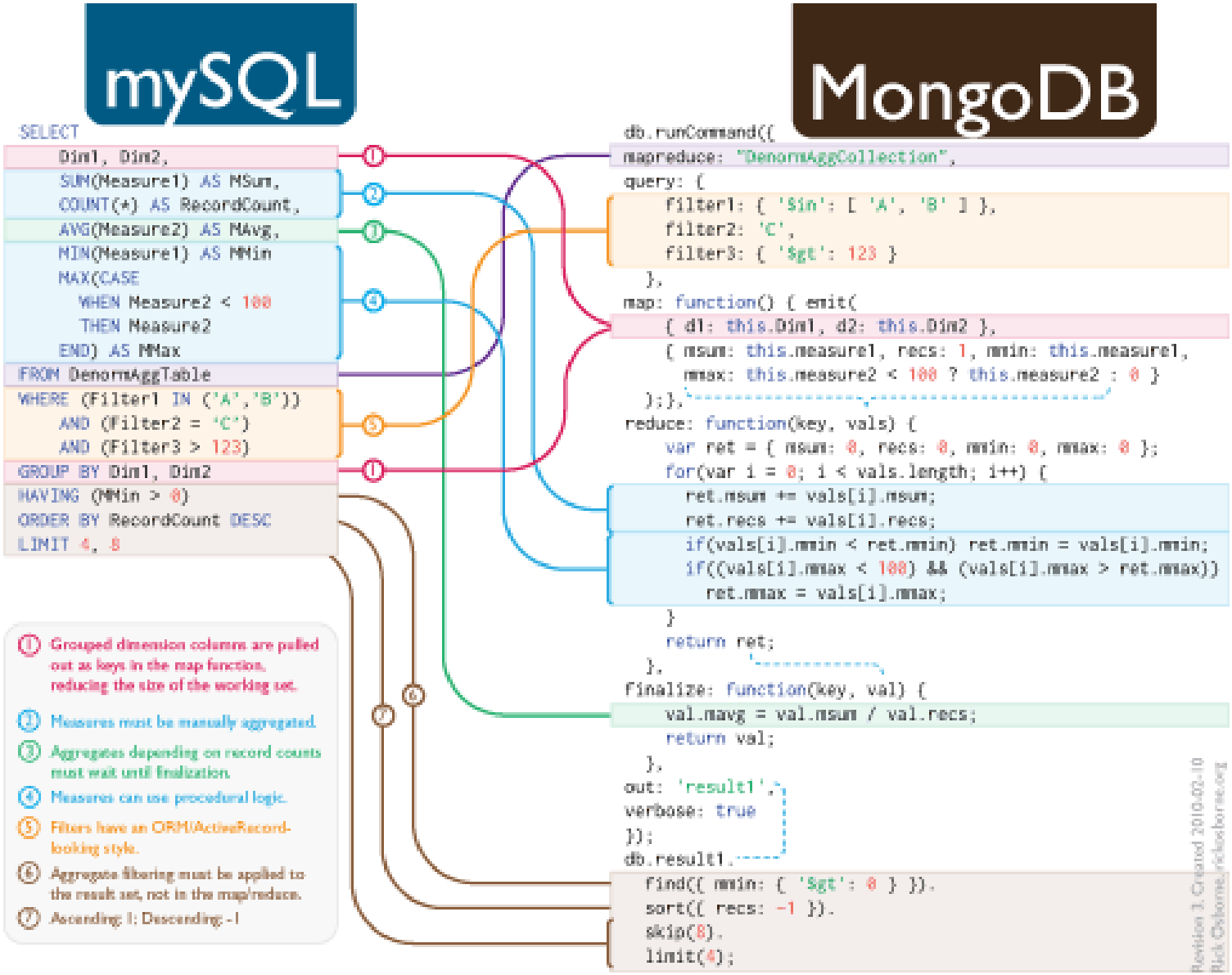
Last Updated: 11 Apr 2011 @ 1737

Medication: AMLODIPINE BESYLATE 10MG TAB
Instructions: TAKE ONE TABLET BY MOUTH TAKE ONE-HALF TABLET FOR
GRAPEFRUIT JUICE--
Status: Active
Refills Remaining: 3
Last Filled On: 20 Aug 2010
Initially Ordered On: 13 Aug 2010
Quantity: 45
Days Supply: 90
Pharmacy: DAYTON
Prescription Number: 2718953

Medication: IBUPROFEN 600MG TAB
Instructions: TAKE ONE TABLET BY MOUTH FOUR TIMES A DAY WITH FOO
Status: Active
Refills Remaining: 3
Last Filled On: 20 Aug 2010
Initially Ordered On: 01 Jul 2010
```

http://blue-button.github.com/challenge/

Where is data?



http://rickosborne.org/blog/2010/02/infographic-migrating-from-sql-to-mapreduce-with-mongodb/

Where is data?

GET blocks/blocking | Twitt

https://dev.twitter.com/docs/api/1/get/blocks/blocking

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cursor to be -1 if it isn't supplied.

Example Values: 12893764510938

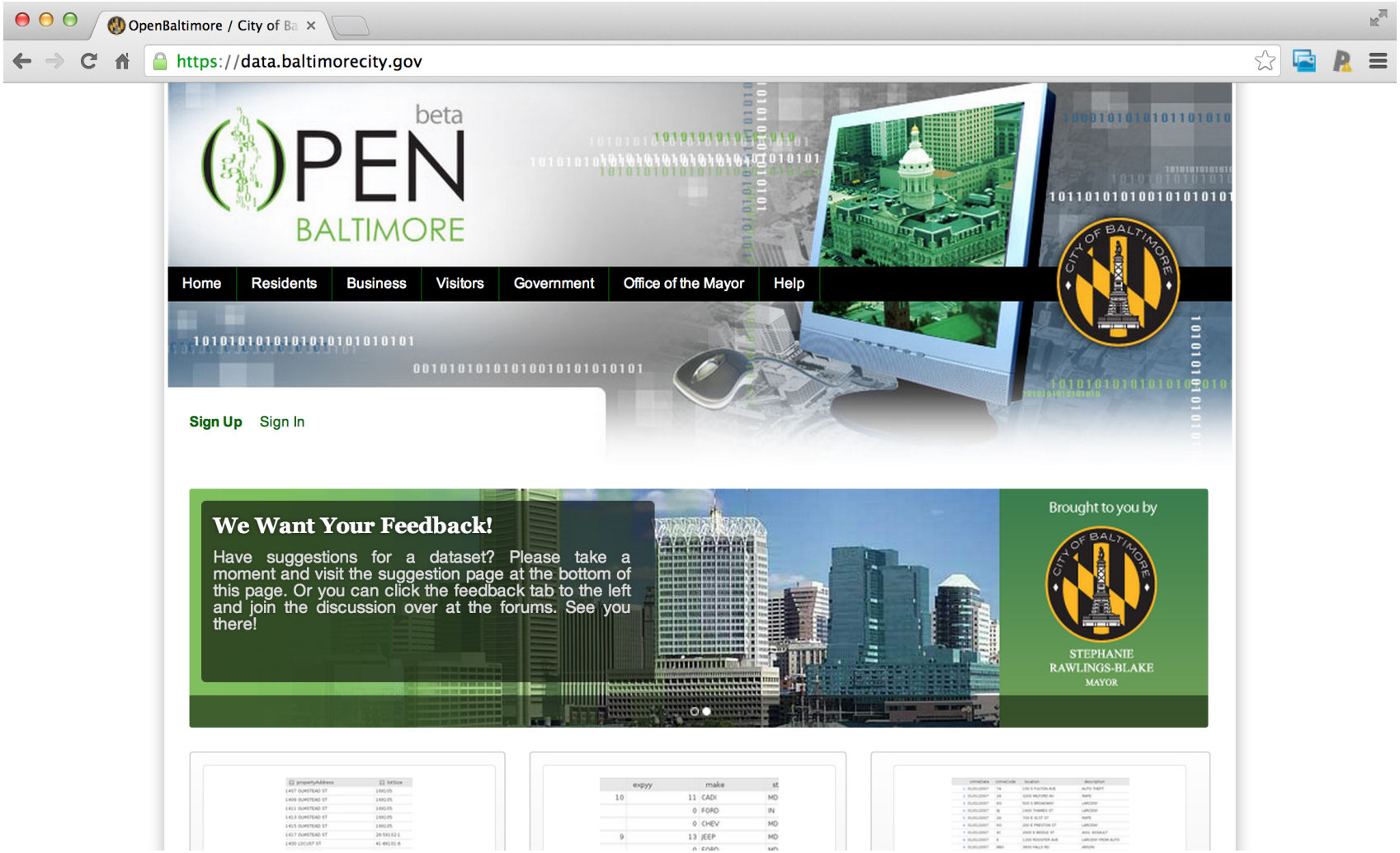
Example Request

GET https://api.twitter.com/1/blocks/blocking.json?cusor=-1&include_entities=true


```
1. {
2.   "previous_cursor": 0,
3.   "previous_cursor_str": "0",
4.   "next_cursor": 0,
5.   "users": [
6.     {
7.       "profile_sidebar_border_color": "C0DEED",
8.       "name": "Javier Heady \r",
9.       "profile_sidebar_fill_color": "DDEEF6",
10.      "profile_background_tile": false,
11.      "location": null,
12.      "created_at": "Thu Mar 01 00:16:47 +0000 2012",
13.      "profile_image_url":
    "http://a0.twimg.com/sticky/default_profile_images/default_profile_4_normal.png",
14.      "is_translator": false,
15.      "id_str": "509466276",
16.      "profile_link_color": "0084B4",
17.      "follow_request_sent": false,
18.      "contributors_enabled": false,
19.      "default_profile": true,
20.      "url": null,
21.      "favourites_count": 0,
22.      "utc_offset": null,
23.      "id": 509466276,
24.      "profile_image_url_https":
    "https://si0.twimg.com/sticky/default_profile_images/default_profile_4_normal.png",
25.      "listed_count": 0,
26.      "profile_use_background_image": true,
27.      "profile_text_color": "333333",
28.      "lang": "en",
29.      "protected": false,
30.      "followers_count": 0,
31.      "geo_enabled": false,
32.      "description": null,
```


https://dev.twitter.com/docs/api/1/get/blocks/blocking

Where is data?



https://data.baltimorecity.gov/

The goal of this course

Raw data -> Processing script -> tidy data -> data analysis -> data communication