Pivot Tables

Pivot Tables

- Pivot Tables are a powerful tool used to group data, and then summarize data by group
- Grouping is a powerful way to organize, and ultimately extract significance from, data

Obama Spending 2012

Variables

- Candidate_name
- Recipient_name
- Disbursement_amount
- Recipient_city
- Recipient_state
- Disbursement_description
- Disbursement_date
- recipient_zip

A	B	C	D	E	F	G	H
candidate_name	recipient_name	disbursement_amount	disbursement_date	recipient_city	recipient_state	recipient_zip	disbursement_description
Obama, Barack	STATE OF ALASKA CORPORATIONS SECTION	50	2011-07-07 00:00:00	JUNEAU	AK	99811	STATE BUSINESS TAX
Obama, Barack	ALASKA DEMOCRATIC PARTY	680	2011-09-28 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY
Obama, Barack	ALASKA DEMOCRATIC PARTY	680	2011-08-25 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY
Obama, Barack	ALASKA DEMOCRATIC PARTY	680	2011-08-25 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY
Obama, Barack	TOUTONGHI, MARY	40	2012-09-28 00:00:00	SOLDOTNA	AK	99669	CATERING/FACILITIES IN-KIND
Obama, Barack	REA, DONNA	40	2012-09-29 00:00:00	KASILOF	AK	99610	POSTAGE IN-KIND
Obama, Barack	SPAYNERS, CINDY	50	2012-10-01 00:00:00	JUNEAU	AK	99801	EVENT SITE RENTAL IN-KIND
Obama, Barack	COSTCO	50.32	2012-10-10 00:00:00	ANCHORAGE	AK	99508	CATERING/FACILITIES
Obama, Barack	DUNCAN, GAIL	100	2012-09-26 00:00:00	SOLDOTNA	AK	99669	POSTAGE IN-KIND
Obama, Barack	EGAN, LINDA	100	2012-09-26 00:00:00	JUNEAU	AK	99801	EVENT SITE RENTAL IN-KIND
Obama, Barack	ALASKA WILD IMAGES ROLLIE OSTERMICK	100	2012-09-22 00:00:00	TALKEETNA	AK	99676	OFFICE SUPPLIES IN-KIND
Obama, Barack	VASQUEZ, MICHELE	15	2012-09-27 00:00:00	KENAI	AK	99611	POSTAGE IN-KIND
Obama, Barack	ALASKA DEMOCRATIC PARTY	650	2012-09-26 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY
Obama, Barack	USPS	15.5	2012-09-28 00:00:00	ANCHORAGE	AK	99503	POSTAGE
Obama, Barack	TOUTONGHI, MARY	35	2012-09-17 00:00:00	SOLDOTNA	AK	99669	POSTAGE IN-KIND
Obama, Barack	TERPENING, KIM	225	2012-09-17 00:00:00	HOMER	AK	99603	OFFICE SUPPLIES IN-KIND
Obama, Barack	WALMART	18.55	2012-09-28 00:00:00	ANCHORAGE	AK	99515	OFFICE SUPPLIES
Obama, Barack	COSTCO	60.46	2012-09-28 00:00:00	ANCHORAGE	AK	99515	OFFICE SUPPLIES
Obama, Barack	MEYER, MICHELLE	1626.76	2012-09-28 00:00:00	ANCHORAGE	AK	99515	PAYROLL
Obama, Barack	MEYER, MICHELLE	1626.76	2012-08-15 00:00:00	ANCHORAGE	AK	99515	PAYROLL
Obama, Barack	ALASKA DEMOCRATIC PARTY	3000	2012-08-01 00:00:00	ANCHORAGE	AK	99503	RENT
Obama, Barack	MEYER, MICHELLE	1626.77	2012-09-12 00:00:00	ANCHORAGE	AK	99515	PAYROLL
Obama, Barack	ALASKA DEMOCRATIC PARTY	600	2012-09-01 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY IN-KIND
Obama, Barack	MEYER, MICHELLE	1626.79	2012-08-31 00:00:00	ANCHORAGE	AK	99515	PAYROLL
Obama, Barack	ALASKA DEMOCRATIC PARTY	2150	2012-09-07 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY IN-KIND
Obama, Barack	CASHEN, THOMAS	100	2012-09-11 00:00:00	JUNEAU	AK	99801	EVENT SITE RENTAL IN-KIND
Obama, Barack	COURTNEY, NANCY	100	2012-09-11 00:00:00	JUNEAU	AK	99801	EVENT SITE RENTAL IN-KIND
Obama, Barack	ALASKA DEMOCRATIC PARTY	1500	2012-02-24 00:00:00	ANCHORAGE	AK	99503	LICENSE FEES
Obama, Barack	ALASKA DEMOCRATIC PARTY	680	2012-02-27 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY
Obama, Barack	USPS	29.9	2012-03-13 00:00:00	ANCHORAGE	AK	99515	POSTAGE
Obama, Barack	ALASKA DEMOCRATIC PARTY	650	2012-03-26 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY
Obama, Barack	ALASKA DEMOCRATIC PARTY	30	2012-03-26 00:00:00	ANCHORAGE	AK	99503	TELEPHONE
Obama, Barack	COSTCO	40.91	2012-03-28 00:00:00	ANCHORAGE	AK		CATERING/FACILITIES
Obama, Barack	FREDMEYER	44.66	2012-03-01 00:00:00	ANCHORAGE	AK	99508	CATERING/FACILITIES
Obama, Barack	ALASKA DEMOCRATIC PARTY	650	2012-04-26 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY
Obama, Barack	ALASKA DEMOCRATIC PARTY	30	2012-04-26 00:00:00	ANCHORAGE	AK	99503	TELEPHONE
Obama, Barack	ALASKA DEMOCRATIC PARTY	650	2012-01-30 00:00:00	ANCHORAGE	AK	99503	RENT/OCCUPANCY

Example queries

- How much money went to each recipient?
- How much money was spent in each state?
- Or maybe you would like to see the breakdown of how much money is spent in each state by city?
- Or a breakdown of spending by date?

Pivot Tables can seamlessly answer all these queries

recipient_state	COUNTUNIQUE of recipient_name
AK	24
AL	42
AR	32
AZ	48
BC	1
CA	636
CO	283
CT	43
DC	414
DE	29
FL	533
GA	110
HA	1
HI	12
IA	321
ID	13
IL	1266
IN	51
JO	1
KS	17
KY	48
LA	30
MA	233
MD	129
ME	20
MH	1
MI	99
MN	106
MO	60
MS	19
MT	25

recipient_name	SUM of disbursement_amount
ALL OCCASIONS EVENT RENTAL	3443.11
IOWA STATE UNIVERSITY	41819.5
NORTH CAROLINA CENTRAL UNI	5126
1-800 FLOWERS	71.36
1-800-FLOWERS	240.02
1-800-FLOWERS.COM	271.81
1-800-GOT-JUNK	3295
1-800-GOT-JUNK OF WESTERN N	299
1000 K LLC	638.92
125 EAST 50TH ST CO LLC	511.23
131 WEST WILSON BUILDING	9
144 MSEH, LLC C/O KUZMAK-WIL	7875
1460 NINTH ST ASSOCIATES	21.6
151 BROADWAY ASSOCIATES, LLC	9725
1540 HARDWARE INC	37.74
17 E ADAMS #0598	27
17TH WARD DEM. POLITICAL OR	80
180 NORTH WABASH, LLC C/O M.	4000
1800 EUCLID HOSPITALITY	45
200 CONVENIENCE	9.92
2012 DOCUMENTARY PARTNERS,	97165
2012 DOCUMENTARY PARTNERS,	62317
2012 DOCUMENTARY PARTNERS,	248130
21 C LLC	547.48
218-226 SOUTH WABASH, LLC	29590.61
230 FIFTH AVENUE ASSOCIATION	76893.33
24 SEVEN TAXI	39.45
24 SEVEN TAXI ASSOCIATION	41
24TH WARD DEM ORG	80
28TH ST MGMT INC	28.8
3 STATEHOUSE PLAZA	67.5

recipient_state	recipient_city	recipient_zip	SUM of disbursement_amount
AK	ANCHORAGE		40.91
		99501	29.88
		99503	18086.36
		99507	66.66
		99508	94.98
		99515	9396.9
		99517	682.91
	ANCHORAGE Total		28398.6
	HOMER	99603	225
	HOMER Total		225
	JUNEAU	99801	350
		99811	75
	JUNEAU Total		425
	KASILOF	99610	40
	KASILOF Total		40
	KENAI	99611	15
	KENAI Total		15
	SOLDOTNA	99669	175
	SOLDOTNA Total		175
	TALKEETNA	99676	100
	TALKEETNA Total		100
AK Total			29378.6
AL	ANCHORAGE	99515	45452.31
	ANCHORAGE Total		45452.31
	BESSEMER	35020	1693.65
	BESSEMER Total		1693.65
	BIGMINGHAM	35226	38.92
	BIGMINGHAM Total		38.92
	BIRMINGHAM	35203	23109.68
		35205	103.4
		35206	47.43

How much money went to each `recipient_name`?

- From the drop-down menus: **`Data->Pivot Table`**
- The entire table will automatically be selected, so click **Create**
- A pivot table editor will appear on the right
- Click on the **Add** button next to **Values**, and select `disbursement_amount`
- Click on the **Add** button next to **Rows**, and select `recipient_name`

recipient_name	SUM of disbursement_amount
ALL OCCASIONS EVENT RENTAL	3443.11
IOWA STATE UNIVERSITY	41819.5
NORTH CAROLINA CENTRAL UNI	5126
1-800 FLOWERS	71.36
1-800-FLOWERS	240.02
1-800-FLOWERS.COM	271.81
1-800-GOT-JUNK	3295
1-800-GOT-JUNK OF WESTERN N	299
1000 K LLC	638.92
125 EAST 50TH ST CO LLC	511.23
131 WEST WILSON BUILDING	9
144 MSEH, LLC C/O KUZMAK-WIL	7875
1460 NINTH ST ASSOCIATES	21.6
151 BROADWAY ASSOCIATES, LLC	9725
1540 HARDWARE INC	37.74
17 E ADAMS #0598	27
17TH WARD DEM. POLITICAL OR	80
180 NORTH WABASH, LLC C/O M	4000
1800 EUCLID HOSPITALITY	45
200 CONVENIENCE	9.92
2012 DOCUMENTARY PARTNERS,	97165
2012 DOCUMENTARY PARTNERS,	62317
2012 DOCUMENTARY PARTNERS,	248130
21 C LLC	547.48
218-226 SOUTH WABASH, LLC	29590.61
230 FIFTH AVENUE ASSOCIATION	76893.33
24 SEVEN TAXI	39.45
24 SEVEN TAXI ASSOCIATION	41
24TH WARD DEM ORG	80
28TH ST MGMT INC	28.8
3 STATEHOUSE PLAZA	67.5

A	B
HESS	401.83
HESS GAS	57
HEYL, BRETT T	4255.43
HEYL, KATHARINE B	4225
HIAWATHA DAVIS JR. RECREATION CENTER	432
HICKEY, BRENDAN	13240.61
HICKIN, VANCE	21522.14
HICKS, COLIN	35
HIGGINS PRO AUDIO	700
HIGGINS, JOSHUA	73898.96
HIGH CRITERIA INC.	35.9
HIGH OUTPUT INC	2224.03
HIGH OUTPUT, INC.	742689.12
HIGH, DAVID MARSHALL	19998.65
HIGHLAND P	21.99
HIGHLAND PARK CVS, L.L.C.	145.53
HIGHLAND PARK PUBLIC LIBRARY	275
HIGHWAY TOLL	157.4
HIGHWAY TOLL ADMINISTRATION	260.05
HIGHWAY TOLL ADMINISTRATION, L	102
HIJANE, LALLA KARIMA	35
HILDEBRAND, ASHER	439.01
HILL TREND CORPORATION	12.69
HILLARY CLINTON FOR PRESIDENT	62782.31
HILLSBOROUGH COMMUNITY COLLEGE DA	4030.69
HILLTOP HEAD SHOP LLC	200
HILLTOP PUBLIC SOLUTIONS, LLC	36855.51
HILTON	5467.56
HILTON - AMERICAS HOUSTON	138.75
HILTON & TOWERS	1389.84
HILTON AT UNIVERSITY PLAC	1935.76
HILTON BEVERLY	7414.43

15330	HILLARY CLINTON FOR PRESIDENT	62782.31	2012-09-27 00:00:00	WASHINGTON	DC	20036	LIST RENTAL MARKET VALUE

How much money was spent in each state?

- From the drop-down menus: **`Data->Pivot Table`**
- The entire table will automatically be selected, so click **Create**
- A pivot table editor will appear on the right
- Click on the **Add** button next to **Values**, and select `disbursement_amount`
- Click on the **Add** button next to **Rows**, and select `recipient_state`

MA	5064283.72
MD	3354372.49
ME	129775.96
MH	16.42
MI	862632.02
MN	1291099.6
MO	13242984.12
MS	51760.36
MT	65980.92
MY	2000
NC	1724649.44
ND	34902.94
NE	424792.01
NH	610323.93
NJ	880235.8
NM	291690.64
NS	38.1
NV	1421950.06
NY	6604421.48
OH	4658679.86
OK	728803.54
ON	797.53
OR	181087.24
PA	864628.86
PR	2595.42
QC	0.9
RI	2100650.44
SC	344508.73
SD	20792.31
SIOUX CITY	0
TN	256819.39
TX	6747983.65

What state is QC?

Amount spent in RI

How much money was spent in each state by city?

- From the drop-down menus: **`Data->Pivot Table`**
- The entire table will automatically be selected, so click **Create**
- A pivot table editor will appear on the right
- Click on the **Add** button next to **Values**, and select `disbursement_amount`
- Click on the **Add** button next to **Rows**, and select `recipient_state`
- Click on the **Add** button next to **Rows**, and select `recipient_city`

A	B	C
recipient_state	*recipient_city*	SUM of disbursem
AK	ANCHORAGE	28398.6
	HOMER	225
	JUNEAU	425
	KASILOF	40
	KENAI	15
	SOLDOTNA	175
	TALKEETNA	100
AK Total		29378.6
AL	ANCHORAGE	45452.31
	BESSEMER	1693.65
	BIGMINGHAM	38.92
	BIRMINGHAM	26112.59
	BRIMINGHAM	26250
	HOMEWOOD	173.41
	HOOVER	55023.11
	JACKSONVILLE	9.97
	MOBILE	2080.41
	MONTGOMERY	3389.84
	MOUNTAIN BROOK	100
	NORTH BIRMINGHAM	32.85
	QUINTON	39.99
	TUSCALOOSA	6530.19
	VESTAVIA	224.88
AL Total		167152.12
AR	BENTONVILLE	2625.33
	FARMINGTON	21659.37
	FEYETTEVILLE	356.74
	FRREST CITY	118.75
	LITTLE ROCK	33780.34
	MOUNTAIN HOME	24395.72
	N. LITTLE ROCK	29.15

QC Total		0.9
RI	CRANSTON	1966155.76
	JOHNSTON	9226.22
	PAWTUCKET	23459.59
	PROVIDENCE	101273.16
	WARWICK	225
	WOONSOCKET	310.71
RI Total		2100650.44

We can sort and filter to answer further queries

- Which recipient was paid the most?
- In which state was the most money spent?
- On which date was the most money spent?
    - Even better: during which month was the most money spent?

Manipulating pivot tables

- We can do the usual sort of fun stuff with our pivot tables
- Try sorting:
  - **`Order->Descending, Sort by->SUM of disbursement_amount`**
- Try color coding:
  - **`Format->Conditional Formatting->Color Scales`**
- Hint: Make sure the whole spreadsheet is selected (otherwise, only the selected region will be affected)

Pivot tables aggregate data by group

Aggregation functions:

- Sum
- Average
- Max
- Min
- Count
- Etc.

What was the maximum expenditure in each state?

- From the drop-down menus: **`Data->Pivot Table`**
- The entire table will automatically be selected, so click **Create**
- A pivot table editor will appear on the right
- Click on the **Add** button next to **Values**, and select `disbursement_amount`
- Click on the **Add** button next to **Rows**, and select `recipient_state`
- Select **Max** under the **Summarize by** dropdown of disbursement_amount

Summary (of Pivot Tables)

- Pivot tables help us summarize and query our data quickly
- Pivot tables can make large intimidating spreadsheets neat and easier to read
- After creating pivot tables, we can apply other techniques, like sorting, to answer further queries, and charting and color coding to visualize the tables

Summary (of Spreadsheets, so far)

- Spreadsheets are fairly easy to learn to use
- And they can do loads of cool stuff, by which I mean wrangle data, sometimes fast and efficiently, other times less so
- They can more or less automatically:
  - Arrange (sort), Filter (delete rows), Mutate (add columns), Aggregate (sum, max, min, etc.), Group by (pivot tables)
- They can less automatically: Select columns or Join data sets