

R Notebook Demo

Introduction

This notebook demonstrates many R Notebook features. Ignore this first chunk for now; we'll come back to it.

Heading

Sub-heading

Another deeper heading

Lists

- apples
 - oranges
 - pears
1. apples
 1. oranges
 2. pears

Link

link

Options for Chunk

Cache

Show both

```
for (i in 1:5000) {  
  lm((i+1)~i)  
}  
6+9
```

```
## [1] 15
```

Echo

Show only output

het resultaat is `r`

Include

Show nothing

Hide

Show only code

```
x <- rnorm(100)
y <- 2*x + rnorm(100)
cor(x, y)
```

Output Types

Console Output

First, let's create a simple code chunk that prints the numbers from 1 to 10. Run this chunk with *Ctrl+Shift+Enter* (*Cmd+Shift+Enter* on OS X).

```
numbers <- seq_len(15)
numbers
```

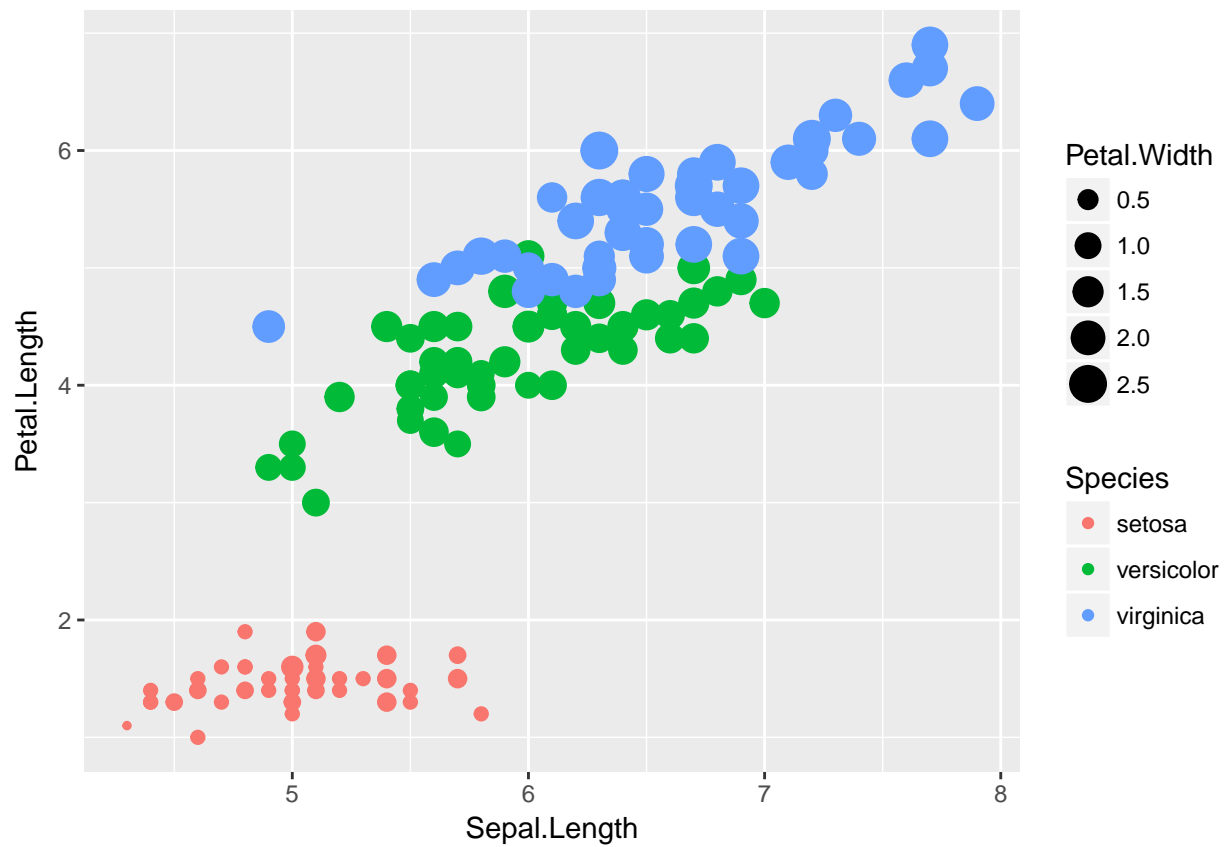
```
## [1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

Notice how the output appears right beneath the chunk, as though you'd run the code at the R console. Try changing the sequence length to 20 and re-running the chunk to see the result update.

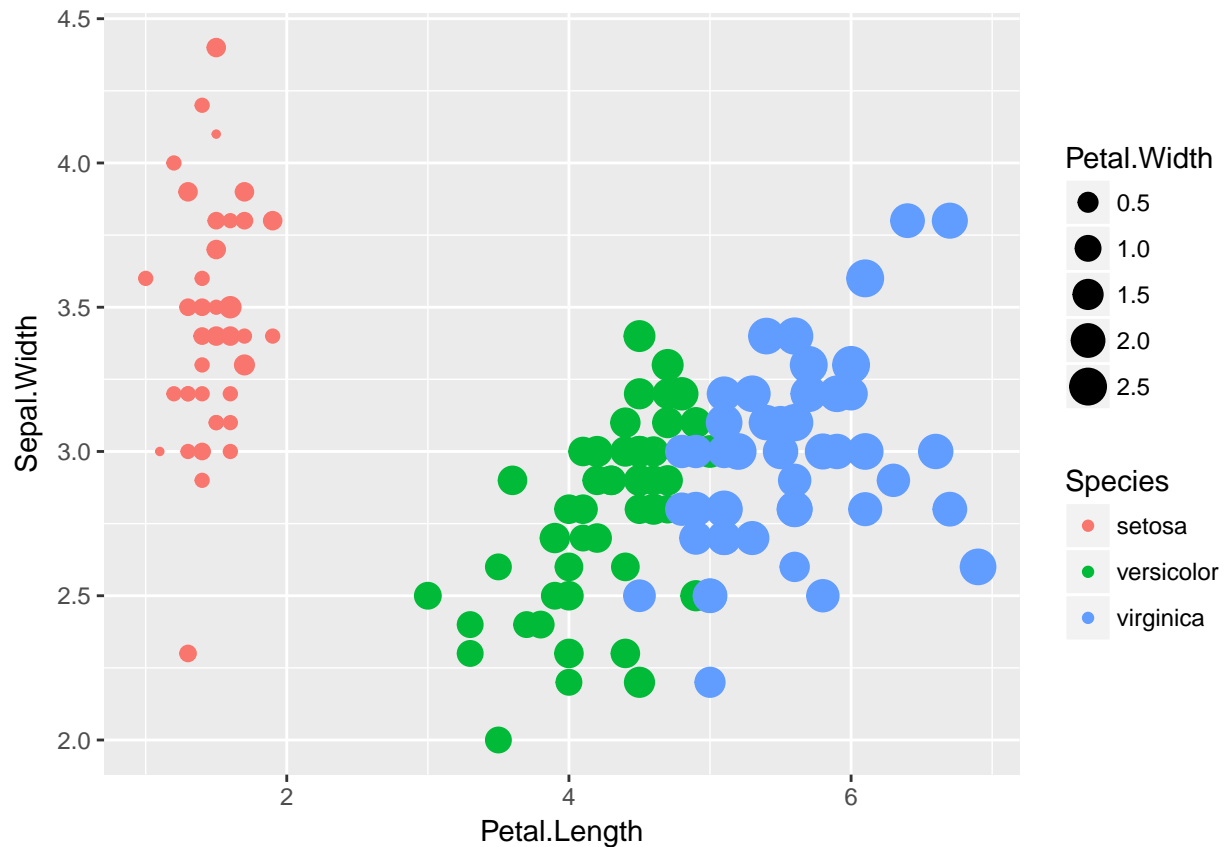
Graphical Output

Of course, sometimes your R code doesn't just produce text; it produces graphical output such as plots. These are supported, too. Try running this chunk:

```
ggplot(iris) +
  geom_point(aes(Sepal.Length, Petal.Length, color = Species, size = Petal.Width))
```



```
ggplot(iris) +  
  geom_point(aes(Petal.Length, Sepal.Width, color = Species, size = Petal.Width))
```



Running Code

One of the goals of the notebook is to provide a seamless environment for interacting with R – that is, you shouldn't need to reach for the console, even though chunks send code there. To help you see the progress of your chunk – that is, which lines have been executed and which haven't – RStudio draws an indicator in the editor gutter. Try running this chunk:

```
Sys.sleep(1); runif(3)
```

```
## [1] 0.3293453 0.8006448 0.2766094
```

```
Sys.sleep(1); runif(3)
```

```
## [1] 0.9373334 0.4851755 0.2260842
```

```
Sys.sleep(1); runif(3)
```

```
## [1] 0.23700865 0.51060043 0.06820734
```

```
Sys.sleep(1); runif(3)
```

```
## [1] 0.6175390 0.8053882 0.7412034
```

```
Sys.sleep(1); runif(3)
```

```
## [1] 0.7878906 0.1018854 0.9646583
```

Alternate Engines

By default, your R notebook chunks will be run using R. However, it's entirely possible to write chunks that use other engines to execute. For instance, you can add some Python to your notebook:

Try using the Feather package for R and Python to transfer data between them.

You can use a notebook to form an executable, documented workflow that composes several tools into a complete data analysis workflow.

Errors

Sometimes your code will generate errors. Here's an example:

```
# Source a file that doesn't exist
source("missing.R")
```

```
## Warning in file(filename, "r", encoding = encoding): no fue posible abrir
## el archivo 'missing.R': No existe el archivo o el directorio

## Error in file(filename, "r", encoding = encoding): no se puede abrir la conexión
```

Notice that the line that caused the error is highlighted, and you can see the error's traceback, just as you can in the RStudio console. If an error occurs while you're running chunks, the error will cause the notebook to stop running, and the cursor will scroll to the point where the error occurred.

Tables

```
library(nycflights13)
library(dplyr)
flights
```

```
## # A tibble: 336,776 x 19
##   year month   day dep_time sched_dep_time dep_delay arr_time
##   <int> <int> <int>   <int>         <int>         <dbl>   <int>
## 1  2013     1     1     517             515           2.     830
## 2  2013     1     1     533             529           4.     850
## 3  2013     1     1     542             540           2.     923
## 4  2013     1     1     544             545          -1.    1004
## 5  2013     1     1     554             600          -6.     812
## 6  2013     1     1     554             558          -4.     740
## 7  2013     1     1     555             600          -5.     913
## 8  2013     1     1     557             600          -3.     709
## 9  2013     1     1     557             600          -3.     838
## 10 2013     1     1     558             600          -2.     753
## # ... with 336,766 more rows, and 12 more variables: sched_arr_time <int>,
## #   arr_delay <dbl>, carrier <chr>, flight <int>, tailnum <chr>,
## #   origin <chr>, dest <chr>, air_time <dbl>, distance <dbl>, hour <dbl>,
## #   minute <dbl>, time_hour <dtm>
```

```
flights %>%
  head(100) %>%
  knitr::kable()
```

year	month	day	dep_time	sched_dep_time	dep_delay	arr_time	sched_arr_time	arr_delay	carrier	flight
2013	1	1	517	515	2	830	819	11	UA	154
2013	1	1	533	529	4	850	830	20	UA	173
2013	1	1	542	540	2	923	850	33	AA	114
2013	1	1	544	545	-1	1004	1022	-18	B6	77
2013	1	1	554	600	-6	812	837	-25	DL	40
2013	1	1	554	558	-4	740	728	12	UA	169
2013	1	1	555	600	-5	913	854	19	B6	50
2013	1	1	557	600	-3	709	723	-14	EV	570
2013	1	1	557	600	-3	838	846	-8	B6	7
2013	1	1	558	600	-2	753	745	8	AA	30
2013	1	1	558	600	-2	849	851	-2	B6	4
2013	1	1	558	600	-2	853	856	-3	B6	7
2013	1	1	558	600	-2	924	917	7	UA	19
2013	1	1	558	600	-2	923	937	-14	UA	112
2013	1	1	559	600	-1	941	910	31	AA	70
2013	1	1	559	559	0	702	706	-4	B6	180
2013	1	1	559	600	-1	854	902	-8	UA	118
2013	1	1	600	600	0	851	858	-7	B6	37
2013	1	1	600	600	0	837	825	12	MQ	463
2013	1	1	601	600	1	844	850	-6	B6	34
2013	1	1	602	610	-8	812	820	-8	DL	197
2013	1	1	602	605	-3	821	805	16	MQ	440
2013	1	1	606	610	-4	858	910	-12	AA	189
2013	1	1	606	610	-4	837	845	-8	DL	174
2013	1	1	607	607	0	858	915	-17	UA	107
2013	1	1	608	600	8	807	735	32	MQ	370
2013	1	1	611	600	11	945	931	14	UA	30
2013	1	1	613	610	3	925	921	4	B6	13
2013	1	1	615	615	0	1039	1100	-21	B6	70
2013	1	1	615	615	0	833	842	-9	DL	57
2013	1	1	622	630	-8	1017	1014	3	US	24
2013	1	1	623	610	13	920	915	5	AA	183
2013	1	1	623	627	-4	933	932	1	UA	49
2013	1	1	624	630	-6	909	840	29	EV	462
2013	1	1	624	630	-6	840	830	10	MQ	459
2013	1	1	627	630	-3	1018	1018	0	US	2
2013	1	1	628	630	-2	1137	1140	-3	AA	47
2013	1	1	628	630	-2	1016	947	29	UA	160
2013	1	1	629	630	-1	824	810	14	AA	30
2013	1	1	629	630	-1	721	740	-19	WN	464
2013	1	1	629	630	-1	824	833	-9	US	103
2013	1	1	632	608	24	740	728	12	EV	414
2013	1	1	635	635	0	1028	940	48	AA	73
2013	1	1	637	645	-8	930	935	-5	B6	38
2013	1	1	639	640	-1	739	749	-10	B6	100
2013	1	1	643	646	-3	922	940	-18	UA	58
2013	1	1	643	645	-2	837	848	-11	US	92
2013	1	1	644	636	8	931	940	-9	UA	170
2013	1	1	645	647	-2	815	810	5	B6	10
2013	1	1	646	645	1	910	916	-6	UA	88
2013	1	1	646	645	1	1023	1030	-7	UA	149
2013	1	1	651	655	-4	936	942	-6	B6	20

year	month	day	dep_time	sched_dep_time	dep_delay	arr_time	sched_arr_time	arr_delay	carrier	flight
2013	1	1	652	655	-3	932	921	11	B6	1
2013	1	1	653	700	-7	936	1009	-33	DL	13
2013	1	1	655	655	0	1021	1030	-9	DL	14
2013	1	1	655	700	-5	1037	1045	-8	DL	18
2013	1	1	655	700	-5	1002	1020	-18	DL	20
2013	1	1	656	700	-4	854	850	4	AA	3
2013	1	1	656	659	-3	949	959	-10	AA	18
2013	1	1	656	705	-9	1007	940	27	MQ	45
2013	1	1	656	700	-4	948	1011	-23	UA	11
2013	1	1	657	700	-3	959	1013	-14	DL	18
2013	1	1	658	700	-2	944	939	5	DL	15
2013	1	1	658	700	-2	1027	1025	2	VX	3
2013	1	1	659	700	-1	1008	1015	-7	AA	22
2013	1	1	659	700	-1	1008	1007	1	B6	9
2013	1	1	659	705	-6	907	913	-6	DL	8
2013	1	1	659	700	-1	959	1008	-9	UA	9
2013	1	1	701	700	1	1123	1154	-31	UA	12
2013	1	1	702	700	2	1058	1014	44	B6	6
2013	1	1	709	700	9	852	832	20	UA	10
2013	1	1	711	715	-4	1151	1206	-15	B6	7
2013	1	1	712	715	-3	1023	1035	-12	AA	8
2013	1	1	715	713	2	911	850	21	UA	5
2013	1	1	717	720	-3	850	840	10	FL	8
2013	1	1	719	721	-2	1017	1012	5	B6	9
2013	1	1	723	725	-2	1013	1017	-4	UA	9
2013	1	1	724	730	-6	1111	1040	31	AA	7
2013	1	1	724	725	-1	1020	1030	-10	AS	1
2013	1	1	725	730	-5	1052	1040	12	AA	20
2013	1	1	727	730	-3	959	952	7	UA	11
2013	1	1	728	732	-4	1041	1038	3	UA	4
2013	1	1	729	730	-1	1049	1115	-26	VX	1
2013	1	1	732	735	-3	857	858	-1	B6	2
2013	1	1	732	729	3	1041	1039	2	B6	16
2013	1	1	732	645	47	1011	941	30	UA	11
2013	1	1	733	736	-3	854	850	4	B6	4
2013	1	1	734	737	-3	1047	1113	-26	B6	6
2013	1	1	739	745	-6	918	930	-12	AA	3
2013	1	1	739	739	0	1104	1038	26	UA	14
2013	1	1	741	745	-4	1038	1036	2	B6	9
2013	1	1	743	730	13	1107	1100	7	AA	3
2013	1	1	743	749	-6	1043	1054	-11	B6	3
2013	1	1	743	730	13	1059	1056	3	DL	4
2013	1	1	745	745	0	1135	1125	10	AA	5
2013	1	1	746	746	0	1119	1129	-10	UA	16
2013	1	1	749	710	39	939	850	49	MQ	37
2013	1	1	752	755	-3	1041	1059	-18	DL	22
2013	1	1	752	750	2	1025	1029	-4	UA	4
2013	1	1	752	759	-7	955	959	-4	US	17

```
library(kableExtra)
flights %>%
```

```

head(200) %>%
knitr::kable(format = "html") %>%
kable_styling() %>%
scroll_box(width = "900px", height = "400px")

```

```

year
month
day
dep_time
sched_dep_time
dep_delay
arr_time
sched_arr_time
arr_delay
carrier
flight
tailnum
origin
dest
air_time
distance
hour
minute
time_hour
2013
1
1
517
515
2
830
819
11
UA
1545
N14228
EWR
IAH

```


227
1400
5
15
2013-01-01 05:00:00
2013
1
1
533
529
4
850
830
20
UA
1714
N24211
LGA
IAH
227
1416
5
29
2013-01-01 05:00:00
2013
1
1
542
540
2
923
850
33
AA
1141
N619AA

JFK
MIA
160
1089
5
40
2013-01-01 05:00:00
2013
1
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544
545
-1
1004
1022
-18
B6
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JFK
BQN
183
1576
5
45
2013-01-01 05:00:00
2013
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1
554
600
-6
812
837
-25
DL

461
N668DN
LGA
ATL
116
762
6
0
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2013
1
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554
558
-4
740
728
12
UA
1696
N39463
EWR
ORD
150
719
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58
2013-01-01 05:00:00
2013
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555
600
-5
913
854

19
B6
507
N516JB
EWR
FLL
158
1065
6
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2013
1
1
557
600
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709
723
-14
EV
5708
N829AS
LGA
IAD
53
229
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2013-01-01 06:00:00
2013
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557
600
-3

838
846
-8
B6
79
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JFK
MCO
140
944
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2013-01-01 06:00:00
2013
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753
745
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ORD
138
733
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2013-01-01 06:00:00
2013
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-2
849
851
-2
B6
49
N793JB
JFK
PBI
149
1028
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2013-01-01 06:00:00
2013
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558
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-2
853
856
-3
B6
71
N657JB
JFK
TPA
158
1005
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2013-01-01 06:00:00
2013
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558
600
-2
924
917
7
UA
194
N29129
JFK
LAX
345
2475
6
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2013-01-01 06:00:00
2013
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558
600
-2
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-14
UA
1124
N53441
EWR
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361
2565
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2013-01-01 06:00:00

2013
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559
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-1
941
910
31
AA
707
N3DUAA
LGA
DFW
257
1389
6
0
2013-01-01 06:00:00
2013
1
1
559
559
0
702
706
-4
B6
1806
N708JB
JFK
BOS
44
187
5

59
2013-01-01 05:00:00
2013
1
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559
600
-1
854
902
-8
UA
1187
N76515
EWR
LAS
337
2227
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2013-01-01 06:00:00
2013
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600
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851
858
-7
B6
371
N595JB
LGA
FLL
152

1076
6
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2013
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1
600
600
0
837
825
12
MQ
4650
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LGA
ATL
134
762
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0
2013-01-01 06:00:00
2013
1
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1
844
850
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B6
343
N644JB
EWR

PBI
147
1023
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610
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812
820
-8
DL
1919
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MSP
170
1020
6
10
2013-01-01 06:00:00
2013
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602
605
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805
16
MQ
4401

N730MQ
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DTW
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502
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5
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910
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6
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610
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845
-8

DL
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760
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607
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0
858
915
-17
UA
1077
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MIA
157
1085
6
7
2013-01-01 06:00:00
2013
1
1
608
600
8
807

735
32
MQ
3768
N9EAMQ
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ORD
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719
6
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2013-01-01 06:00:00
2013
1
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611
600
11
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931
14
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JFK
SFO
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613
610

3
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1039
1100
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615
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833
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1014
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2133
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30
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2013

1
1
623
610
13
920
915
5
AA
1837
N3EMAA
LGA
MIA
153
1096
6
10
2013-01-01 06:00:00
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1
623
627
-4
933
932
1
UA
496
N459UA
LGA
IAH
229
1416
6
27

2013-01-01 06:00:00

2013

1

1

624

630

-6

909

840

29

EV

4626

N11107

EWR

MSP

190

1008

6

30

2013-01-01 06:00:00

2013

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1

624

630

-6

840

830

10

MQ

4599

N518MQ

LGA

MSP

166

1020

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30
2013-01-01 06:00:00
2013
1
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627
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1018
1018
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27
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PHX
330
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2013-01-01 06:00:00
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-3
AA
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N3BAAA
JFK
SJU

192
1598
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LAX
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824
810
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LGA
ORD
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2013
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629
630
-1
721
740
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LGA
BWI
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30
2013-01-01 06:00:00
2013
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629
630
-1
824
833
-9
US

1019
N426US
EWR
CLT
91
529
6
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2013-01-01 06:00:00
2013
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632
608
24
740
728
12
EV
4144
N13553
EWR
IAD
52
212
6
8
2013-01-01 06:00:00
2013
1
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635
635
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1028
940

48
AA
711
N3GKAA
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DFW
248
1389
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35
2013-01-01 06:00:00
2013
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637
645
-8
930
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389
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144
950
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2013-01-01 06:00:00
2013
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639
640
-1

739
749
-10
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1002
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JFK
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187
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2013-01-01 06:00:00
2013
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643
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556
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1023
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2013-01-01 06:00:00
2013
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643

645
-2
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848
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926
N178US
EWR
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529
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2013-01-01 06:00:00
2013
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931
940
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UA
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N75435
EWR
FLL
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1065
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36
2013-01-01 06:00:00
2013
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645
647
-2
815
810
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N796JB
JFK
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63
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2013-01-01 06:00:00
2013
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646
645
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910
916
-6
UA
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N569UA
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243
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2013
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Saving and Sharing

A notebook's source code is always in an `.Rmd` file. Whenever you save it, a sidecar `.nb.html` file is generated. This file contains a rendered copy of the notebook itself. No special viewer is required.

It also contains a copy of the notebook's source `.Rmd` file.

To look at the `.nb.html` file, click *Preview* in the RStudio editor toolbar. This is a fundamental difference between notebooks and other R Markdown documents; pressing this button doesn't actually cause any of your code to run, it just shows you the HTML file already prepared. It will automatically update whenever you save the `.Rmd` file.

If you open the `.nb.html` file in a web browser, you'll see an option to download the source. You can also open an `.nb.html` file in RStudio; when you do this, RStudio will automatically extract the `.Rmd` file and outputs inside it and open the file in the notebook editor.

Further reading

R Notebook Reference