

1. Numero de vuelos por día en el año

| | | | | | | | |
|------------|-------|------------|-------|------------|-------|------------|-------|
| 2015-01-01 | 13950 | 2015-02-17 | 16077 | 2015-04-05 | 15534 | 2015-05-22 | 17132 |
| 2015-01-02 | 16741 | 2015-02-18 | 16175 | 2015-04-06 | 16943 | 2015-05-23 | 12947 |
| 2015-01-03 | 15434 | 2015-02-19 | 16402 | 2015-04-07 | 16332 | 2015-05-24 | 13155 |
| 2015-01-04 | 16352 | 2015-02-20 | 16470 | 2015-04-08 | 16678 | 2015-05-25 | 15914 |
| 2015-01-05 | 16548 | 2015-02-21 | 12897 | 2015-04-09 | 16867 | 2015-05-26 | 16782 |
| 2015-01-06 | 15315 | 2015-02-22 | 15177 | 2015-04-10 | 16895 | 2015-05-27 | 16824 |
| 2015-01-07 | 15571 | 2015-02-23 | 16375 | 2015-04-11 | 13426 | 2015-05-28 | 17052 |
| 2015-01-08 | 16009 | 2015-02-24 | 15906 | 2015-04-12 | 15994 | 2015-05-29 | 17083 |
| 2015-01-09 | 16008 | 2015-02-25 | 16159 | 2015-04-13 | 16795 | 2015-05-30 | 13482 |
| 2015-01-10 | 12344 | 2015-02-26 | 16441 | 2015-04-14 | 16298 | 2015-05-31 | 16094 |
| 2015-01-11 | 14754 | 2015-02-27 | 16460 | 2015-04-15 | 16617 | 2015-06-01 | 17002 |
| 2015-01-12 | 15888 | 2015-02-28 | 12882 | 2015-04-16 | 16823 | 2015-06-02 | 16731 |
| 2015-01-13 | 15180 | 2015-03-01 | 15171 | 2015-04-17 | 16881 | 2015-06-03 | 16773 |
| 2015-01-14 | 15520 | 2015-03-02 | 16449 | 2015-04-18 | 13413 | 2015-06-04 | 17234 |
| 2015-01-15 | 16020 | 2015-03-03 | 15988 | 2015-04-19 | 15988 | 2015-06-05 | 17266 |
| 2015-01-16 | 16070 | 2015-03-04 | 16238 | 2015-04-20 | 16796 | 2015-06-06 | 14241 |
| 2015-01-17 | 12070 | 2015-03-05 | 16622 | 2015-04-21 | 16354 | 2015-06-07 | 16674 |
| 2015-01-18 | 13855 | 2015-03-06 | 16686 | 2015-04-22 | 16652 | 2015-06-08 | 17312 |
| 2015-01-19 | 15841 | 2015-03-07 | 14226 | 2015-04-23 | 16832 | 2015-06-09 | 17119 |
| 2015-01-20 | 15187 | 2015-03-08 | 16109 | 2015-04-24 | 16891 | 2015-06-10 | 17165 |
| 2015-01-21 | 15525 | 2015-03-09 | 16882 | 2015-04-25 | 13425 | 2015-06-11 | 17391 |
| 2015-01-22 | 16013 | 2015-03-10 | 16417 | 2015-04-26 | 15928 | 2015-06-12 | 17440 |
| 2015-01-23 | 16056 | 2015-03-11 | 16696 | 2015-04-27 | 16790 | 2015-06-13 | 14782 |
| 2015-01-24 | 12280 | 2015-03-12 | 16977 | 2015-04-28 | 16325 | 2015-06-14 | 16691 |
| 2015-01-25 | 14720 | 2015-03-13 | 17028 | 2015-04-29 | 16614 | 2015-06-15 | 17374 |
| 2015-01-26 | 15890 | 2015-03-14 | 14364 | 2015-04-30 | 16830 | 2015-06-16 | 17176 |
| 2015-01-27 | 15155 | 2015-03-15 | 16160 | 2015-05-01 | 16894 | 2015-06-17 | 17236 |
| 2015-01-28 | 15525 | 2015-03-16 | 16903 | 2015-05-02 | 13384 | 2015-06-18 | 17432 |
| 2015-01-29 | 16030 | 2015-03-17 | 16427 | 2015-05-03 | 15985 | 2015-06-19 | 17462 |
| 2015-01-30 | 16080 | 2015-03-18 | 16691 | 2015-05-04 | 16862 | 2015-06-20 | 14812 |
| 2015-01-31 | 12037 | 2015-03-19 | 16964 | 2015-05-05 | 16383 | 2015-06-21 | 16739 |
| 2015-02-01 | 13406 | 2015-03-20 | 16993 | 2015-05-06 | 16697 | 2015-06-22 | 17406 |
| 2015-02-02 | 15975 | 2015-03-21 | 14341 | 2015-05-07 | 16926 | 2015-06-23 | 17209 |
| 2015-02-03 | 15164 | 2015-03-22 | 16135 | 2015-05-08 | 16992 | 2015-06-24 | 17259 |
| 2015-02-04 | 15499 | 2015-03-23 | 16901 | 2015-05-09 | 13134 | 2015-06-25 | 17441 |
| 2015-02-05 | 16010 | 2015-03-24 | 16423 | 2015-05-10 | 15743 | 2015-06-26 | 17474 |
| 2015-02-06 | 16023 | 2015-03-25 | 16700 | 2015-05-11 | 16934 | 2015-06-27 | 14848 |
| 2015-02-07 | 12259 | 2015-03-26 | 16962 | 2015-05-12 | 16653 | 2015-06-28 | 16466 |
| 2015-02-08 | 14726 | 2015-03-27 | 16982 | 2015-05-13 | 16732 | 2015-06-29 | 17098 |
| 2015-02-09 | 15891 | 2015-03-28 | 14314 | 2015-05-14 | 16999 | 2015-06-30 | 16644 |
| 2015-02-10 | 15176 | 2015-03-29 | 16100 | 2015-05-15 | 17024 | 2015-07-01 | 16991 |
| 2015-02-11 | 15541 | 2015-03-30 | 16935 | 2015-05-16 | 13375 | 2015-07-02 | 17437 |
| 2015-02-12 | 16303 | 2015-03-31 | 16528 | 2015-05-17 | 16070 | 2015-07-03 | 14656 |
| 2015-02-13 | 16476 | 2015-04-01 | 16784 | 2015-05-18 | 16993 | 2015-07-04 | 12634 |
| 2015-02-14 | 12611 | 2015-04-02 | 16981 | 2015-05-19 | 16711 | 2015-07-05 | 16679 |
| 2015-02-15 | 14408 | 2015-04-03 | 16850 | 2015-05-20 | 16834 | 2015-07-06 | 17432 |
| 2015-02-16 | 16302 | 2015-04-04 | 13615 | 2015-05-21 | 17203 | 2015-07-07 | 17258 |

| | | | | | | | |
|------------|-------|------------|-------|------------|-------|------------|-------|
| 2015-07-08 | 17278 | 2015-08-26 | 16622 | 2015-10-14 | 16384 | 2015-12-02 | 15860 |
| 2015-07-09 | 17438 | 2015-08-27 | 16897 | 2015-10-15 | 16676 | 2015-12-03 | 16278 |
| 2015-07-10 | 17471 | 2015-08-28 | 16929 | 2015-10-16 | 16582 | 2015-12-04 | 16215 |
| 2015-07-11 | 14916 | 2015-08-29 | 13238 | 2015-10-17 | 12722 | 2015-12-05 | 12200 |
| 2015-07-12 | 16771 | 2015-08-30 | 15792 | 2015-10-18 | 15828 | 2015-12-06 | 15101 |
| 2015-07-13 | 17390 | 2015-08-31 | 16859 | 2015-10-19 | 16593 | 2015-12-07 | 16043 |
| 2015-07-14 | 17252 | 2015-09-01 | 16253 | 2015-10-20 | 16095 | 2015-12-08 | 15575 |
| 2015-07-15 | 17296 | 2015-09-02 | 16408 | 2015-10-21 | 16389 | 2015-12-09 | 15849 |
| 2015-07-16 | 17419 | 2015-09-03 | 16835 | 2015-10-22 | 16596 | 2015-12-10 | 16259 |
| 2015-07-17 | 17469 | 2015-09-04 | 16789 | 2015-10-23 | 16589 | 2015-12-11 | 16263 |
| 2015-07-18 | 14892 | 2015-09-05 | 11986 | 2015-10-24 | 12799 | 2015-12-12 | 12239 |
| 2015-07-19 | 16765 | 2015-09-06 | 12627 | 2015-10-25 | 15697 | 2015-12-13 | 15116 |
| 2015-07-20 | 17399 | 2015-09-07 | 15609 | 2015-10-26 | 16509 | 2015-12-14 | 16056 |
| 2015-07-21 | 17236 | 2015-09-08 | 16007 | 2015-10-27 | 15439 | 2015-12-15 | 15670 |
| 2015-07-22 | 17288 | 2015-09-09 | 15383 | 2015-10-28 | 15743 | 2015-12-16 | 16100 |
| 2015-07-23 | 17425 | 2015-09-10 | 15709 | 2015-10-29 | 16381 | 2015-12-17 | 16579 |
| 2015-07-24 | 17474 | 2015-09-11 | 15729 | 2015-10-30 | 16082 | 2015-12-18 | 16710 |
| 2015-07-25 | 14874 | 2015-09-12 | 12315 | 2015-10-31 | 11708 | 2015-12-19 | 14724 |
| 2015-07-26 | 16770 | 2015-09-13 | 15619 | 2015-11-01 | 15652 | 2015-12-20 | 15865 |
| 2015-07-27 | 17409 | 2015-09-14 | 16328 | 2015-11-02 | 16596 | 2015-12-21 | 16306 |
| 2015-07-28 | 17241 | 2015-09-15 | 15607 | 2015-11-03 | 15918 | 2015-12-22 | 16261 |
| 2015-07-29 | 17282 | 2015-09-16 | 16110 | 2015-11-04 | 16363 | 2015-12-23 | 16481 |
| 2015-07-30 | 17423 | 2015-09-17 | 16534 | 2015-11-05 | 16619 | 2015-12-24 | 13338 |
| 2015-07-31 | 17453 | 2015-09-18 | 16557 | 2015-11-06 | 16600 | 2015-12-25 | 12633 |
| 2015-08-01 | 14951 | 2015-09-19 | 12539 | 2015-11-07 | 12793 | 2015-12-26 | 15273 |
| 2015-08-02 | 16799 | 2015-09-20 | 15685 | 2015-11-08 | 15679 | 2015-12-27 | 16509 |
| 2015-08-03 | 17453 | 2015-09-21 | 16495 | 2015-11-09 | 16470 | 2015-12-28 | 16312 |
| 2015-08-04 | 17308 | 2015-09-22 | 15606 | 2015-11-10 | 16026 | 2015-12-29 | 16199 |
| 2015-08-05 | 17342 | 2015-09-23 | 15959 | 2015-11-11 | 16308 | 2015-12-30 | 16260 |
| 2015-08-06 | 17467 | 2015-09-24 | 16539 | 2015-11-12 | 16599 | 2015-12-31 | 13133 |
| 2015-08-07 | 17517 | 2015-09-25 | 16583 | 2015-11-13 | 16572 | | |
| 2015-08-08 | 14925 | 2015-09-26 | 12668 | 2015-11-14 | 12793 | | |
| 2015-08-09 | 16560 | 2015-09-27 | 15794 | 2015-11-15 | 15691 | | |
| 2015-08-10 | 17254 | 2015-09-28 | 16540 | 2015-11-16 | 16489 | | |
| 2015-08-11 | 17044 | 2015-09-29 | 15842 | 2015-11-17 | 16075 | | |
| 2015-08-12 | 17077 | 2015-09-30 | 16291 | 2015-11-18 | 16379 | | |
| 2015-08-13 | 17291 | 2015-10-01 | 16600 | 2015-11-19 | 16661 | | |
| 2015-08-14 | 17315 | 2015-10-02 | 16625 | 2015-11-20 | 16639 | | |
| 2015-08-15 | 14407 | 2015-10-03 | 12673 | 2015-11-21 | 12964 | | |
| 2015-08-16 | 16550 | 2015-10-04 | 15784 | 2015-11-22 | 14991 | | |
| 2015-08-17 | 17179 | 2015-10-05 | 16577 | 2015-11-23 | 14808 | | |
| 2015-08-18 | 16468 | 2015-10-06 | 16100 | 2015-11-24 | 16083 | | |
| 2015-08-19 | 16634 | 2015-10-07 | 16390 | 2015-11-25 | 16725 | | |
| 2015-08-20 | 16932 | 2015-10-08 | 16674 | 2015-11-26 | 10068 | | |
| 2015-08-21 | 16964 | 2015-10-09 | 16623 | 2015-11-27 | 12813 | | |
| 2015-08-22 | 13468 | 2015-10-10 | 12829 | 2015-11-28 | 16072 | | |
| 2015-08-23 | 15978 | 2015-10-11 | 15754 | 2015-11-29 | 17574 | | |
| 2015-08-24 | 16870 | 2015-10-12 | 16616 | 2015-11-30 | 16952 | | |
| 2015-08-25 | 16446 | 2015-10-13 | 16108 | 2015-12-01 | 15823 | | |

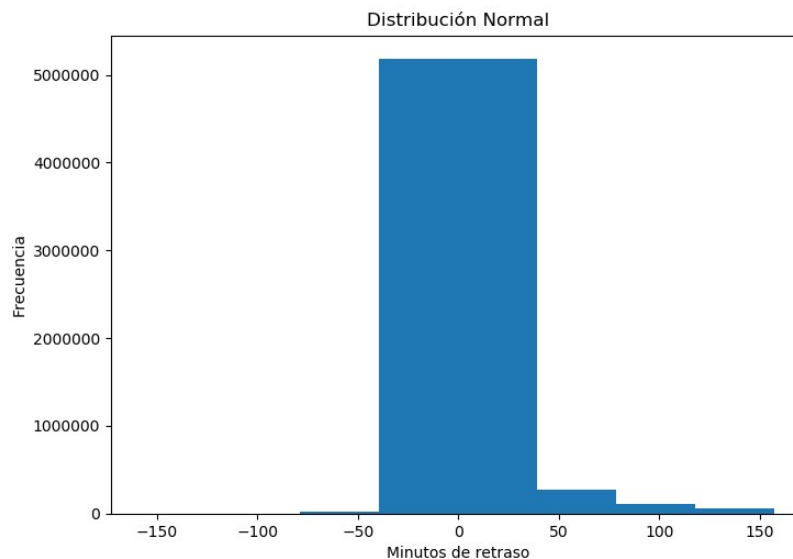
2. Numero de vuelos que se originan en un aeropuerto y numero de vuelos que tienen como destino un aeropuerto.

| | ORIGIN_PORT | DESTINATION_PORT |
|-------|-------------|------------------|
| 10135 | 226.0 | 227.0 |
| 10136 | 189.0 | 190.0 |
| 10140 | 1712.0 | 1710.0 |
| 10141 | 67.0 | 67.0 |
| 10146 | 82.0 | 82.0 |
| 10154 | 28.0 | 28.0 |
| 10155 | 140.0 | 140.0 |
| 10157 | 113.0 | 114.0 |
| 10158 | 232.0 | 232.0 |
| | | |
| TOL | 962.0 | 961.0 |
| TPA | 63906.0 | 63914.0 |
| TRI | 1928.0 | 1929.0 |
| TTN | 2830.0 | 2836.0 |
| TUL | 13970.0 | 13970.0 |
| TUS | 15117.0 | 15116.0 |
| TVC | 2756.0 | 2758.0 |
| TWF | 815.0 | 815.0 |
| TXK | 978.0 | 976.0 |
| TYR | 2300.0 | 2299.0 |
| TYS | 6963.0 | 6964.0 |
| UST | 155.0 | 155.0 |
| VEL | 206.0 | 205.0 |
| VLD | 935.0 | 935.0 |
| VPS | 4868.0 | 4868.0 |
| WRG | 664.0 | 664.0 |
| WYS | 208.0 | 208.0 |
| XNA | 9283.0 | 9284.0 |
| YAK | 662.0 | 662.0 |
| YUM | 1877.0 | 1878.0 |
| 10666 | NaN | 1.0 |

son mas de 900 aeropuertos por eso muestro solo una parte de estos, se puede observar que en la mayoría coincide o es muy parecido el numero de vuelos que se originan que los que son destino. También se puede observar que hay casi el doble de pistas independientes que aeropuertos 609 independientes y 322 aeropuertos

3. Numero de vuelos de acuerdo al retraso de -4 a 4 desviaciones estándar

```
(base) jhonn@jhonn-Inspiron-7566:~/Documentos/ciencia_datos/vuelos$ python retraso.py
sys:1: DtypeWarning: Columns (7,8) have mixed types.Specify dtype option on import or
Media: 4.407057357987598
Desviacion estandar: 39.27129365752419
Entre -4 y -3 : 0
Entre -3 y -2 : 10
Entre -2 y -1 : 22917
Entre -1 y 1 : 5188493
Entre 1 y 2 : 273765
Entre 2 y 3 : 108855
Entre 3 y 4 : 54575
(base) jhonn@jhonn-Inspiron-7566:~/Documentos/ciencia_datos/vuelos$
```



no tiene forma de una distribución normal, ya que los datos que tiene no son simétricos o parecidos, los datos que tiene están muy dispersos por eso tiene una desviación estándar muy alta

4. Numero de vuelos desde un aeropuerto a cada uno de sus destinos de mayor a menor.

Como prueba se eligió el aeropuerto Internacional de Philadelphia (PHL)

```
(base) jhonn@jhonn-Inspiron-7566:~/Documentos/ciencia_datos/vuelos$ python aeropuerto.py PHL
sys:1: DtypeWarning: Columns (7,8) have mixed types.Specify dtype option on import or set low
Vuelos> totales: 66021
aeropuerto.py > ...

DESTINATION_AIRPORT
ATL 6621
BOS 5317
MCO 4869
ORD 4759
DFW 3625
CLT 3103
MIA 2661
TPA 2425
PHX 2411
MSP 2365
IAH 2176
LAS 2148
DEN 2142
SFO 2072
DTW 1999
FLL 1907
MDW 1892
LAX 1886
PBI 1110
SJU 1028
SEA 990
RSW 960
PIT 883
RDU 854
SAN 794
BNA 630
SLC 616
STL 610
IND 421
JAX 384
MSY 359
PVD 284
AUS 268
SAT 231
STT 227
LGA 226
MYR 194
PDX 147
DAL 114
DCA 106
CLE 104
SMF 75
CHS 11
BWI 7
RIC 6
BDL 4
```