cat <input file> | python mapper.py | sort -k1,1 | python reducer.py

Average price

*#!/usr/bin/env python  
  
import* sys  
  
sys.stdin.readline()  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 items = line.split(",")  
 price = (*float*(items[1]) + *float*(items[4]))/2  
 input\_date = items[0].split("-")  
 output\_date = input\_date[0] + "." + input\_date[1]  
 *print*('%s\t%s' % (output\_date, price))

*#!/usr/bin/env python  
  
import* sys  
  
monthly\_prices = {}  
yearly\_prices = {}  
  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 output\_date, price = line.split("\t")  
 *try*:  
 price = *float*(price)  
 *except ValueError*:  
 *continue  
  
 if* output\_date *not in* monthly\_prices:  
 monthly\_prices[output\_date] = {'total\_price': 0.0, 'count': 0}  
  
 monthly\_prices[output\_date]['total\_price'] += price  
 monthly\_prices[output\_date]['count'] += 1  
  
*for* month, values *in* monthly\_prices.items():  
 average\_price = values['total\_price'] / values['count']  
 *print*(f"{month} - {average\_price}")  
  
  
*for* month, values *in* monthly\_prices.items():  
 year = month.split('.')[0]  
  
 *if* year *not in* yearly\_prices:  
 yearly\_prices[year] = {'total\_price': 0.0, 'count': 0}  
  
 yearly\_prices[year]['total\_price'] += values['total\_price']  
 yearly\_prices[year]['count'] += values['count']  
  
*for* year, values *in* yearly\_prices.items():  
 average\_price = values['total\_price'] / values['count']  
 *print*(f"{year} - {average\_price}")

Average change

*#!/usr/bin/env python  
  
import* sys  
  
sys.stdin.readline()  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 item = line.split(",")  
 change = ((*float*(item[4]) - *float*(item[1])) / *float*(item[1])) \* 100  
 input\_date = item[0].split("-")  
 output\_date = input\_date[0] + "." + input\_date[1]  
 *print*('%s\t%s' % (output\_date, change))

*#!/usr/bin/env python  
  
import* sys  
  
monthly\_change = {}  
yearly\_change = {}  
  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 date, change = line.split('\t', 1)  
 *try*:  
 change = *float*(change)  
 *except ValueError*:  
 *continue  
  
 if* date *not in* monthly\_change:  
 monthly\_change[date] = {'change': 0.0, 'count': 0}  
  
 monthly\_change[date]['change'] += change  
 monthly\_change[date]['count'] += 1  
  
*for* month, values *in* monthly\_change.items():  
 avg\_change = *int*(values['change'] / values['count'])  
 *print*(f"{month} - {avg\_change} %")  
  
  
*for* date, values *in* monthly\_change.items():  
 year = date.split(".")[0]  
  
 *if* year *not in* yearly\_change:  
 yearly\_change[year] = {'change': 0.0, 'count': 0}  
  
 yearly\_change[year]['change'] += values['change']  
 yearly\_change[year]['count'] += values['count']  
  
*for* year, values *in* yearly\_change.items():  
 avg\_change = *int*(values['change'] / values['count'])  
 *print*(f"{year} - {avg\_change} %")

Min

*#!/usr/bin/env python  
  
import* sys  
  
sys.stdin.readline()  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 item = line.split(",")  
 price = (*float*(item[4]) + *float*(item[1])) / 2  
 date = item[0].split("-")  
 output\_date = date[0] + "." + date[1]  
 *print*('%s\t%s' % (output\_date, price))

*#!/usr/bin/env python  
  
import* sys  
  
monthly\_min\_price = {}  
yearly\_min\_price = {}  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 date, price = line.split('\t')  
  
 *try*:  
 price = *float*(price)  
 *except ValueError*:  
 *continue  
  
 if* date *not in* monthly\_min\_price *or* price < monthly\_min\_price[date]:  
 monthly\_min\_price[date] = price  
  
 year = date.split(".")[0]  
 *if* year *not in* yearly\_min\_price *or* price < yearly\_min\_price[year]:  
 yearly\_min\_price[year] = price  
  
  
*for* date, price *in* monthly\_min\_price.items():  
 *print*(f"{date} - {price}")  
  
*for* year, price *in* yearly\_min\_price.items():  
 *print*(f"{year} - {price}")

Max

*#!/usr/bin/env python  
  
import* sys  
  
sys.stdin.readline()  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 item = line.split(",")  
 price = (*float*(item[4]) + *float*(item[1])) / 2  
 date = item[0].split("-")  
 output\_date = date[0] + "." + date[1]  
 *print*("%s\t%s" % (output\_date, price))

*#!/usr/bin/env python  
  
import* sys  
  
monthly\_max\_price = {}  
yearly\_max\_price = {}  
  
*for* line *in* sys.stdin:  
 line = line.strip()  
 date, price = line.split('\t')  
  
 *try*:  
 price = *float*(price)  
 *except ValueError*:  
 *continue  
  
 if* date *not in* monthly\_max\_price *or* price > monthly\_max\_price[date]:  
 monthly\_max\_price[date] = price  
  
 year = date.split('.')[0]  
 *if* year *not in* yearly\_max\_price *or* price > yearly\_max\_price[year]:  
 yearly\_max\_price[year] = price  
  
*for* date, price *in* monthly\_max\_price.items():  
 *print*(f"{date} - {price}")  
  
*for* year, price *in* yearly\_max\_price.items():  
 *print*(f"{year} - {price}")