

Big Data Analysis using Hadoop

-By Shubham Mehta

Objective: The objective of this project is to demonstrate the ability and usability of the Hadoop framework for analyzing large volumes of data (Big Data).

Architecture

Operating System	Stand-alone Ubuntu-server-12.04 running in VMWare on Windows 10, 64-bit
Memory	2GB
IDE	Eclipse
Java	1.6
Hadoop Release	1.0.3
Other Tools	Putty, WinSCP

Source of Data: <https://www.kaggle.com/kaggle/sf-salaries>

Here is a direct link to the csv file used for this project:

<https://drive.google.com/file/d/0B0j0S5rFLpGxQWZLUkxfdGlvb3c/view?usp=sharing>

Size of Data: 13.9 MB (Approximately 148,655 records)

Work Objective

Use Pig to do the following:

- 1) Find the average total pay of each profession in San Francisco
- 2) Find the top 10 highest paid professions in San Francisco
- 3) Find the 10 lowest paid professions in San Francisco
- 4) Find the 10 most worked profession in San Francisco (from 2011 to 2014)
- 5) Display the salary trend of each profession from 2012 to 2014
- 6) Find the 10 professions with the greatest growth in salary from 2012 to 2014

Solution

1. Copy file from Window to Ubuntu using WinSCP
2. For file ingestion, run the command: `hadoop fs -copyFromLocal /home/notroot/lab/data/SF_Salaries.txt /input`
3. Let us first load the data
4. `salaries = LOAD '/input/SF_Salaries.txt' using PigStorage('\t') AS (id:int,employee:chararray,job_title:chararray,basepay:float,overtime:float,otherpay:float,totalpay:float,totalpaybenefits:float,year:int,agency:chararray);`

5. Let us now dump the data to see that the data was loaded properly

6. **dump salaries;**

```
(148418,Darryn M Tyson,Recreation Leader,225.75,0.0,5.42,231.17,231.17,2014,San Francisco)
(148419,Julian Chang,"BdComm Mbr, Grp2,M=$25/Mtg",225.0,0.0,0.0,225.0,227.25,2014,San Francisco)
(148420,Heather Stephenson,"BdComm Mbr, Grp2,M=$25/Mtg",225.0,0.0,0.0,225.0,227.25,2014,San Francisco)
(148421,Diane C. Lawrence,Commissioner No Benefits,225.0,0.0,0.0,225.0,227.25,2014,San Francisco)
(148422,Louise Hines,Commissioner No Benefits,225.0,0.0,0.0,225.0,227.25,2014,San Francisco)
(148423,Ching Ting Wan,"BdComm Mbr, Grp2,M=$25/Mtg",225.0,0.0,0.0,225.0,227.25,2014,San Francisco)
(148424,Timothy J Wilkins,Recreation Leader,223.6,0.0,0.0,223.6,225.84,2014,San Francisco)
(148425,Catherine Russo,Commissioner No Benefits,225.0,0.0,0.0,225.0,225.0,2014,San Francisco)
(148426,Marisol Montero,PS Aide Health Services,206.55,0.0,13.77,220.32,222.52,2014,San Francisco)
(148427,Charles M Louden,Pool Lifeguard,179.63,0.0,0.0,179.63,222.06,2014,San Francisco)
(148428,Daniel K Harris-Lucas,Recreation Leader,219.82,0.0,0.0,219.82,222.02,2014,San Francisco)
(148429,Frankie M Johnson,Senior Eligibility Worker,0.0,0.0,187.5,187.5,221.42,2014,San Francisco)
(148430,Nicholas R Macaluso,Public Svc Aide-Public Works,214.0,0.0,5.02,219.02,221.21,2014,San Francisco)
(148431,Michielle T Marzan,Nursing Assistant,0.0,0.0,220.5,220.5,220.5,2014,San Francisco)
(148432,Rosa-Leah L Martinez-Davis,Special Nurse,150.45,0.0,30.09,180.54,220.05,2014,San Francisco)
(148433,Lauren C Slingsby,Asst Engr,0.0,0.0,219.12,219.12,219.12,2014,San Francisco)
(148434,Naina B Gurung,Public Svc Aide-Public Works,211.8,0.0,4.96,216.76,218.93,2014,San Francisco)
```

7. The data has been loaded properly

8. Now let us eliminate noisy data by getting rid of records where the total pay is less than or equal to zero

9. **filteredsalaries = FILTER salaries BY (totalpay>0);**

10. Now we will run the following commands in order to obtain the average salary of each profession in San Francisco

- First group together each profession
- **groupedsalaries = GROUP filteredsalaries BY job_title;**

```
("LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",{188,DONALD FIELDS,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",158603.6,2605.95,4
6493.65,207703.2,207703.2,2011,San Francisco),(247,TYRONE PRUITT,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",158603.6,3242.47,39271.71,2
01117.78,201117.78,2011,San Francisco),(1219,DANIEL DECOSSIO,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",144362.14,9503.16,10982.55,1648
47.84,164847.84,2011,San Francisco),(340,ALEC BALMY,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",145835.81,12062.79,36872.29,194770.9,194
770.9,2011,San Francisco),(361,JOSEPH CUFF,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",158603.62,0.0,34724.71,193328.33,193328.33,2011,S
an Francisco),(4909,WILLIAM BIGARANI,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",77999.58,1137.34,45635.88,124772.8,124772.8,2011,San Fr
ancisco),(131,SOFIA MATHEWS,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",158603.69,0.0,57667.12,216270.8,216270.8,2011,San Francisco),(78
,BERT REYES,"LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",73754.05,18679.06,139279.69,231712.8,231712.8,2011,San Francisco))
("SENIOR INVESTIGATOR, OFFICE OF CITIZEN'S COMPLAINT",{11306,EDWARD MCMAHON,"SENIOR INVESTIGATOR, OFFICE OF CITIZEN'S COMPLAINT",91548.01,0.0,0.
0,91548.01,91548.01,2011,San Francisco),(11303,DENNIS MAXSON,"SENIOR INVESTIGATOR, OFFICE OF CITIZEN'S COMPLAINT",91548.06,0.0,0.0,91548.06,91548
.06,2011,San Francisco),(11305,RODERICK BALTAZAR,"SENIOR INVESTIGATOR, OFFICE OF CITIZEN'S COMPLAINT",91548.01,0.0,0.0,91548.01,91548.01,2011,San
Francisco))
("SENIOR SUPERVISING PROBATION OFFICER, JUVENILE POU",{25634,WILLIAM JOHNSTON,"SENIOR SUPERVISING PROBATION OFFICER, JUVENILE POU",46804.65,0.0,
0.0,46804.65,46804.65,2011,San Francisco))
("TRACK MAINTENANCE SUPERINTENDENT,MUNICIPAL RAILWAY",{11113,ROBERT RAMIREZ,"TRACK MAINTENANCE SUPERINTENDENT,MUNICIPAL RAILWAY",92168.64,0.0,14
6.0,92314.64,92314.64,2011,San Francisco))
```

- Now we will generate the average for each profession
- **averagebyprofession = FOREACH groupedsalaries GENERATE group,ROUND(AVG(filteredsalaries.totalpay)*100.0)/100.0;**
- **dump averagebyprofession;**

(DEPUTY DIRECTOR I - MUNICIPAL TRANSPORTATION AGE,171207.81)
 (DEPUTY DIRECTOR II - MUNICIPAL TRANSPORTATION AG,200921.48)
 (STREET ENVIRONMENTAL SERVICES OPERATIONS SUPERVI,91833.3)
 (CONFIDENTIAL CHIEF ATTORNEY II (CIVIL & CRIMINAL),214988.69)
 (SENIOR INDUSTRIAL HYGIENIST DEPT OF PUBLIC HEALTH,109496.03)
 (WATER CONSTRUCTION AND MAINTENANCE SUPERINTENDENT,150352.69)
 ("ASSISTANT CHIEF OF DEPARTMENT, (FIRE DEPARTMENT)",203427.84)
 ("CHIEF STATIONARY ENGINEER, WATER TREATMENT PLANT",130454.31)
 ("ELECTRONIC INSTRUMENTATION TECHNICIAN,WTR PLTN CN",80391.13)
 ("EXECUTIVE DIRECTOR, SOUTHEAST COMMUNITY FACILITY",101033.76)
 ("SENIOR MARRIAGE, FAMILY & CHILD COUNSELOR (MFCC)",72756.59)
 (ELECTRONIC MAINTENANCE TECHNICIAN ASSISTANT SUPERV,115570.36)
 (SENIOR CENTRAL PROCESSING AND DISTRIBUTION TECHNIC,81631.3)
 ("ELECTRICAL TRANSIT MECHANIC, ASSISTANT SUPERVISOR",126152.28)
 ("REPRESENTATIVE, COMMISSION ON THE STATUS OF WOMEN",68896.73)
 ("SENIOR CLAIMS INVESTIGATOR,CITY ATTORNEY'S OFFICE",103262.7)
 ("SENIOR STATIONARY ENGINEER, WATER TREATMENT PLANT",100294.81)
 ("AIRPORT ASSISTANT DEPUTY DIRECTOR, BUSINESS ADMINI",1927.5)
 ("APPRENTICE STATIONARY ENGINEER,WATER TREATMENT PLN",59027.81)
 ("ASSISTANT TO THE DIRECTOR, PUBLIC AFFAIRS RS",95283.35)
 ("CAPTAIN, BUREAU OF FIRE PREVENTION AND PUBLIC SAFE",206704.63)
 ("DIRECTOR OF ACTIVITIES, THERAPY AND VOLUNTEER SERV",77140.88)
 ("EXECUTIVE ASSISTANT TO THE ADMINISTRATOR, S.F.G.H.",88136.8)
 ("EXECUTIVE ASSISTANT TO THE GENERAL MANAGER, RETIRE",111821.33)
 ("INSPECTOR, BUREAU OF FIRE PREVENTION AND PUBLIC SA",161040.71)
 ("LIEUTENANT, BUREAU OF FIRE PREVENTION AND PUBLIC S",191815.56)
 ("SENIOR INVESTIGATOR, OFFICE OF CITIZEN'S COMPLAINT",91548.03)
 ("SENIOR SUPERVISING PROBATION OFFICER, JUVENILE POU",46804.65)
 ("TRACK MAINTENANCE SUPERINTENDENT,MUNICIPAL RAILWAY",92314.64)

11. Now we must find the 10 highest paid professions in San Francisco

```

- orderaverages = ORDER averagebyprofession BY $1 DESC;
- top10 = LIMIT orderaverages 10;
- dump top10;
-

(GENERAL MANAGER-METROPOLITAN TRANSIT AUTHORITY,399211.28)
(Chief Investment Officer,339653.69)
(Chief of Police,329183.65)
("Chief, Fire Department",325971.68)
(DEPUTY DIRECTOR OF INVESTMENTS,307899.47)
("CHIEF OF DEPARTMENT, (FIRE DEPARTMENT)",302377.72)
("Gen Mgr, Public Trnsp Dept",297769.41)
(Asst Chf of Dept (Fire Dept),281763.48)
("DEPUTY CHIEF OF DEPARTMENT,(FIRE DEPARTMENT)",279359.56)
("Dep Dir for Investments, Ret",278592.54)

```

12. Similarly, we will find the 10 lowest paid professions in San Francisco

```

- ordered = ORDER averagebyprofession BY $1 ASC;
- low10 = LIMIT ordered 10;

```

- `dump low10;`

```
(PUBLIC SAFETY COMMUNICATIONS TECHNICIAN,149.51)
("BdComm Mbr, Grp2,M=$25/Mtg",270.31)
("BOARD/COMMISSION MEMBER, GROUP II",296.51)
("BOARD/COMMISSION MEMBER, GROUP III",638.79)
(SPECIAL ASSISTANT XIV,673.8)
("BdComm Mbr, Grp3,M=$50/Mtg",731.94)
("BOARD/COMMISSION MEMBER, GROUP V",1195.9)
(SPECIAL EXAMINER,1201.26)
("BdComm Mbr, Grp5,M$100/Mo",1216.39)
("Commissioner 16.700c, No Pay",1288.0)
```

13. Now we will find the 10 most worked professions in San Francisco (from 2011 to 2014)

- Let us first count the number of workers for each profession
- `countworkers = FOREACH groupedsalaries GENERATE group,COUNT(filtered salaries.id);`
- `dump countworkers;`

```
(BUILDINGS AND GROUNDS MAINTENANCE SUPERINTENDENT,13)
(DEPUTY DIRECTOR I - MUNICIPAL TRANSPORTATION AGE,5)
(DEPUTY DIRECTOR II - MUNICIPAL TRANSPORTATION AG,5)
(STREET ENVIRONMENTAL SERVICES OPERATIONS SUPERVI,10)
(CONFIDENTIAL CHIEF ATTORNEY II (CIVIL & CRIMINAL),3)
(SENIOR INDUSTRIAL HYGIENIST DEPT OF PUBLIC HEALTH,10)
(WATER CONSTRUCTION AND MAINTENANCE SUPERINTENDENT,2)
("ASSISTANT CHIEF OF DEPARTMENT, (FIRE DEPARTMENT)",3)
("CHIEF STATIONARY ENGINEER, WATER TREATMENT PLANT",5)
("ELECTRONIC INSTRUMENTATION TECHNICIAN,WTR PLTNCN",20)
```
- `ordercount = ORDER countworkers BY $1 DESC;`
- `ten = LIMIT ordercount 10;`
- `dump ten;`

```
(Transit Operator,6994)
(Special Nurse,4386)
(Registered Nurse,3734)
(Public Svc Aide-Public Works,2516)
(Police Officer 3,2417)
(Custodian,2412)
(TRANSIT OPERATOR,2387)
(Firefighter,2353)
(Recreation Leader,1968)
(Patient Care Assistant,1944)
```

14. Now we will display the salary trend of each profession from 2012 to 2014

- Let us first find the average salary of each profession for each year

- `sal_2012 = FILTER filteredsalaries BY (year == 2012);`
- `group_2012 = GROUP sal_2012 BY job_title;`
- `avg_2012 = FOREACH group_2012 GENERATE`
`group,(ROUND(AVG(sal_2012.totalpay)*100.0)/100.0) as avg;`
- `dump avg_2012;`

```
("Sergeant, (Police Department)",145309.5)
("Sr. Stationary Eng, Sew Plant",104477.62)
("AprntcStatnry Eng,WtrTreatPlnt",77481.43)
("Area Sprv Parks, Squares & Fac",94496.46)
("Asst Chf, Bur Clm Invest&Admin",141360.48)
("Asst Clk, Board of Supervisors",87907.85)
("Battlion Chief, Fire Suppressi",224413.62)
("Cfdntal Chf Atty 2, (Cvl&Crmnl)",217891.94)
("Counselor, Juvenile Hall SFERS",8073.27)
("Counselor,Log Cabin Rnch SFERS",9860.71)
("Dir of Act, Therapy & Vol Svcs",85006.89)
("Inspector, (Police Department)",158692.51)
("Investigator,Taxi & AccessSvcs",76670.0)
("Manager,Employee Relations Div",137599.72)
("Marriage, Family & Child Cnslr",70879.54)
("Mgr, Unified Family Court Svcs",87195.34)
("Pr DistAtty Invstgtor,SpecUnit",21802.1)
("Pr Investigator, Tax Collector",91463.06)
("Secretary, Comm on the Environ",93235.74)
("Sr Statnry Eng, Wtr Treat Plnt",111456.51)
("SrClaimsInvstgtor,Cty Atty Ofc",98916.12)
("StdntDsgnTrain1, Arch/Eng/Plng",13628.26)
("StdntDsgnTrain3, Arch/Eng/Plng",15540.24)
("Track Maint Supt, Muni Railway",97341.68)
```

- `sal_2013 = FILTER filteredsalaries BY (year == 2013);`
- `group_2013 = GROUP sal_2013 BY job_title;`
- `avg_2013 = FOREACH group_2013 GENERATE`
`group,(ROUND(AVG(sal_2013.totalpay)*100.0)/100.0) as avg;`
- `dump avg_2013;`


```

("Sr. Stationary Eng, Sew Plant",111797.53)
("AprntcStatnry Eng,WtrTreatPlnt",78357.5)
("Area Sprv Parks, Squares & Fac",93935.2)
("Asst Chf, Bur Clm Invest&Admin",147938.0)
("Asst Clk, Board of Supervisors",98568.57)
("Battalion Chief, Fire Suppress",254710.56)
("Capt,Fire Prev or Fire Invsgtn",209648.89)
("Cfdntal Chf Atty 2,(Cvl&Crml)",225365.83)
("Counselor, Juvenile Hall SFERS",24327.57)
("Counselor,Log Cabin Rnch SFERS",16477.46)
("Dir of Act, Therapy & Vol Svcs",88947.25)
("Inspector, (Police Department)",121677.56)
("Investigator,Taxi & AccessSvcs",70878.35)
("Manager,Employee Relations Div",131059.31)
("Marriage, Family & Child Cnslr",73992.19)
("Mgr, Unified Family Court Svcs",70553.35)
("Pr Investigator, Tax Collector",97119.0)
("Secretary, Comm on the Environ",99768.45)
("Sr Statnry Eng, Wtr Treat Plnt",114586.21)
("SrClaimsInvstgtor,Cty Atty Ofc",113277.03)
("StdntDsgnTrain1, Arch/Eng/Plng",15621.18)
("StdntDsgnTrain3, Arch/Eng/Plng",17995.98)
("Track Maint Supt, Muni Railway",92454.17)

```

- sal_2014 = FILTER filteredsalaries BY (year == 2014);
- group_2014 = GROUP sal_2014 BY job_title;
- avg_2014 = FOREACH group_2014 GENERATE
group,(ROUND(AVG(sal_2014.totalpay)*100.0)/100.0) as avg;
- dump avg_2014;

```

("Secretary, Library Commission",94063.04)
("Senior Property Manager, Port",113158.1)
("Sergeant, (Police Department)",159620.63)
("Sr. Stationary Eng, Sew Plant",104283.4)
("AprntcStatnry Eng,WtrTreatPlnt",77383.46)
("Area Sprv Parks, Squares & Fac",93143.45)
("Asst Clk, Board of Supervisors",94246.26)
("Battalion Chief, Fire Suppress",250173.94)
("Capt,Fire Prev or Fire Invsgtn",206548.84)
("Cfdntal Chf Atty 2,(Cvl&Crml)",201998.15)
("Counselor, Juvenile Hall SFERS",29537.77)
("Counselor,Log Cabin Rnch SFERS",21535.17)
("Dir of Act, Therapy & Vol Svcs",88015.24)
("Inspector, (Police Department)",173918.2)
("Investigator,Taxi & AccessSvcs",86234.48)
("Manager,Employee Relations Div",149799.36)
("Marriage, Family & Child Cnslr",72210.18)
("Pr Investigator, Tax Collector",98840.57)
("Secretary, Comm on the Environ",98753.01)
("Sr Statnry Eng, Wtr Treat Plnt",103095.53)
("SrClaimsInvstgtor,Cty Atty Ofc",111168.81)
("StdntDsgnTrain1, Arch/Eng/Plng",13919.23)
("StdntDsgnTrain3, Arch/Eng/Plng",15496.84)

```

- We can now perform a join
- **yearwise = JOIN avg_2012 BY group, avg_2013 BY group, avg_2014 BY group;**
- **STORE yearwise INTO '/output/YearByYear';**

File: [/output/YearByYear/part-r-00000](#)

Goto :

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Training Spec 0 110853.0					
Engineer/Architect Principal	140119.15	Engineer/Architect Principal	163913.87	Engineer/Architect Principal	159103.29
Environmental Service Worker	20283.25	Environmental Service Worker	35980.01	Environmental Service Worker	37823.69
General Laborer Supervisor 1	63936.31	General Laborer Supervisor 1	66953.75	General Laborer Supervisor 1	70099.51
Health Program Coordinator 1	63068.08	Health Program Coordinator 1	58748.46	Health Program Coordinator 1	51223.3
Health Program Coordinator 2	66246.89	Health Program Coordinator 2	77425.49	Health Program Coordinator 2	74704.74
Health Program Coordinator 3	84160.43	Health Program Coordinator 3	93987.04	Health Program Coordinator 3	93085.32
Hospital Elig Wrk Supervisor	93214.96	Hospital Elig Wrk Supervisor	105709.09	Hospital Elig Wrk Supervisor	104025.58
IS Program Analyst-Assistant	45327.41	IS Program Analyst-Assistant	19172.33	IS Program Analyst-Assistant	30640.05
IS Programmer Analyst-Senior	85657.68	IS Programmer Analyst-Senior	75613.07	IS Programmer Analyst-Senior	82916.21
Illustrator and Art Designer	74159.79	Illustrator and Art Designer	79765.46	Illustrator and Art Designer	60324.09
Institutional Police Officer	80547.29	Institutional Police Officer	92414.26	Institutional Police Officer	82020.88
Mail & Reproduction Svc Sprv	74621.55	Mail & Reproduction Svc Sprv	46714.3	Mail & Reproduction Svc Sprv	69463.89
Maintenance Machinist Sprv 1	104474.16	Maintenance Machinist Sprv 1	87082.06	Maintenance Machinist Sprv 1	114324.76
Materials Testing Technician	56884.48	Materials Testing Technician	69071.69	Materials Testing Technician	68474.87
Municipal Stadium Groundskpr	103965.9	Municipal Stadium Groundskpr	126528.4	Municipal Stadium Groundskpr	100411.9
Perf Analyst III Project Mgr	103770.32	Perf Analyst III Project Mgr	97844.4	Perf Analyst III Project Mgr	101352.0
Physical Therapist Assistant	60157.18	Physical Therapist Assistant	73680.89	Physical Therapist Assistant	84233.8
Pr Fare Collections Receiver	89391.53	Pr Fare Collections Receiver	97164.86	Pr Fare Collections Receiver	99210.38
Pr Payroll & Personnel Clerk	80565.25	Pr Payroll & Personnel Clerk	83642.95	Pr Payroll & Personnel Clerk	79442.12
Pr Personal Property Auditor	85798.68	Pr Personal Property Auditor	103010.65	Pr Personal Property Auditor	101734.01
Principal Environ Specialist	97280.51	Principal Environ Specialist	106769.92	Principal Environ Specialist	91544.42

15. Now we will find the 10 professions with the greatest growth in salary from 2012 to 2014

- We can do this by first finding the percent increase for each profession and then simply displaying the 10 greatest
- **growth = FOREACH yearwise GENERATE avg_2012::group as g, (((avg_2014::avg - avg_2012::avg)/avg_2012::avg)*100.0) as p;**
- **dump growth;**

```
(("Chf Statnry Eng,WtrTreat Plnt",29.10866034193341)
("Div Director, Adult Probation",3.9526972284743027)
("Electrl Trnst Mech, Asst Sprv",2.6987375227205614)
("Ex Asst to Ex Dir, Retirement",-0.9841183466137416)
("Inspector, Weights & Measures",-2.6563883888426907)
("Operating Engineer, Universal",7.286996596245449)
("Sctry, Human Svcs. Commission",19.75542744612256)
("Secretary, Library Commission",5.938741095143222)
("Senior Property Manager, Port",2.5858951454099692)
("Sergeant, (Police Department)",9.848722898365217)
("Sr. Stationary Eng, Sew Plant",-0.18589627137371734)
("AprntcStatnry Eng,WtrTreatPlnt",-0.12644320064818967)
("Area Sprv Parks, Squares & Fac",-1.4318102498231249)
("Asst Clk, Board of Supervisors",7.210288955991971)
("Cfdntal Chf Atty 2,(Cvl&Crmnl)",-7.294345077656388)
("Counselor, Juvenile Hall SFERS",265.8712021275146)
("Counselor,Log Cabin Rnch SFERS",118.39370592989755)
("Dir of Act, Therapy & Vol Svcs",3.5389484311212955)
("Inspector, (Police Department)",9.594460381274454)
("Investigator,Taxi & AccessSvcs",12.474866310160422)
("Manager,Employee Relations Div",8.866035483211727)
("Marriage, Family & Child Cnslr",1.8773259533004862)
("Pr Investigator, Tax Collector",8.066108874992823)
("Secretary, Comm on the Environ",5.917548356456429)
("Sr Statnry Eng, Wtr Treat Plnt",-7.501562717153082)
("SrClaimsInvstgtr,Cty Atty Ofc",12.38694967008411)
("StdntDsgnTrain1, Arch/Eng/Plng",2.1350487883266047)
("StdntDsgnTrain3, Arch/Eng/Plng",-0.27927496615238656)
```

- ordergrowth = ORDER growth BY p DESC;
- growth10 = LIMIT ordergrowth 10;
- dump growth10;

(Animal Control Supervisor,1127.5797495095821)
(Legislative Asst City Atty Ofc,485.24310542627074)
(Orthopedic Technician 1,387.86239195674676)
("Counselor, Juvenile Hall SFERS",265.8712021275146)
("Asst Director, Juvenile Hall",220.08774451948617)
(Barber,202.83105577795166)
(Deputy Sheriff 1,193.90762892865567)
(Mayoral Staff IV,189.69275183358317)
(Deputy Probation Officer SFERS,166.48701053985437)
(Assistant Recreation Director,142.96209500427778)