Question 1:

File Loading for Business.csv and Review.csv:

```
//load business.csv file as a line
A = LOAD './kunal/business.csv' AS line;
// Now convert them into tuple
B= FOREACH A GENERATE FLATTEN((tuple(chararray,chararray)))
REGEX_EXTRACT_ALL(line,'(.*)\\:\\:(.*)\\)) AS (busid,add,categ);
// Load review.csv file as a line
C = Load './kunal/review.csv' AS Line;
// Now convert them into tuple
D = FOREACH C GENERATE FLATTEN((tuple(chararray,chararray,chararray,float))
REGEX_EXTRACT_ALL(Line,'(.*)\:(.*)\:(.*)')) AS (reviewid,uid,bid,rating);
//create group based on bid
E = group D by bid;
// find the avg for each bid
F = foreach E generate group as business_id, AVG(D.rating) as avg_rating;
Join Operation:
G = join F by business_id, B by busid;
H= distinct G;
I = filter H by (add matches '.*Palo Alto.*');
```

```
// ordering and limit ouput to 10
J = order I by avg rating desc;
Final = limit J 10;
Final_result= foreach Final generate(busid, add, categ);
Store Final_result into './kunal/Final1/';
Output:
((TCjOnOepk9KNXIPMHI9BLA,855 El Camino RealPalo Alto, CA 94301,List(Food, Coffee & Tea,
Cafes, Restaurants),,,,,,))
((T2F7YtQU0Kyg53vjlkk2fA,795 El Camino RealPalo Alto, CA 94301,List(Dermatologists, Doctors,
Health and Medical),,,,,,))
((x1tVp-Id4b6ZVYi3rF34ug,232 Stanford Shopping CtrPalo Alto, CA 94304,List(Nail Salons,
Beauty and Spas),,,,,,))
((Q0-PK8gX9uDILltcSR6l2Q,805 El Camino RealSte BPalo Alto, CA 94301,List(Doctors, Health and
Medical, Internal Medicine),,,,,,))
((0LP9bCzXRtICAPAm1jO0-Q,855 El Camino RealSte 35Palo Alto, CA 94301,List(Women's
Clothing, Fashion, Shopping, Shoe Stores),,,,,,,))
((S506FIQdswKA0anIIQSF_g,Palo Alto, CA 94309,List(Food, Coffee & Tea, Event Planning &
Services, Caterers),,,,,,))
((xyJQ3SQvNUpcSIb5aWUMAQ,875 Blake Wilbur DrPalo Alto, CA 94304,List(Doctors, Health
and Medical, Oncologist),,,,,,))
((y-7t0ZDNgSHuAtyebDsRrQ,1101 Welch RdPalo Alto, CA 94304,List(Doctors, Health and
Medical, Internal Medicine),,,,,,))
```

((zrmO-d-Mw3kv9dWa7Trr9Q,1101 Welch RdSte A1Palo Alto, CA 94304,List(Doctors, Health and Medical, Pediatricians),,,,,,))

((hpGnFiTQ6YqtS7o9knm97w,900 Welch Road #105Palo Alto, CA 94304,List(Doctors, Health and Medical, Obstetricians and Gynecologists),,,,,,))

Question 2:

File Loading for Business.csv and Review.csv:

```
//load business.csv file as a line
A = LOAD './kunal/business.csv' AS line;

// Now convert them into tuple

B= FOREACH A GENERATE FLATTEN((tuple(chararray,chararray,chararray)))
REGEX_EXTRACT_ALL(line,'(.*)\\:\\:(.*)\\:\\:(.*)')) AS (busid,add,categ);

// Load review.csv file as a line

C = Load './kunal/review.csv' AS Line;

// Now convert them into tuple

D = FOREACH C GENERATE FLATTEN((tuple(chararray,chararray,chararray,float)))
REGEX_EXTRACT_ALL(Line,'(.*)\\:\\:(.*)\\:\\:(.*)\\:\\:(.*)\\)) AS (reviewid,uid,bid,rating);

//create group based on bid

E = group D by bid;

// find the avg for each bid
F = foreach E generate group as business_id, AVG(D.rating) as avg_rating;
```

```
Join Operation:
G = join F by business_id, B by busid;
H= distinct G;
I = filter H by (add matches '.*CA.*') AND NOT(add matches '.*Palo Alto.*');
// ordering and limit ouput to 10
J = order I by avg rating desc;
Final = limit J 10;
Final result= foreach Final generate(busid, add, categ);
Store Final_result into './kunal/Final2/';
OUTPUT:
((Vv51G8x0tmJrJUjd687lcw,200 Medical PlazaSte 430WestwoodLos Angeles, CA
90095, List(Doctors, Health and Medical, Obstetricians and Gynecologists),,,,,,,))
((WBFZ5Mfm0ph hEiS9-yh7A,10666 N Torrey Pines RdSorrento ValleyLa Jolla, CA
92037,List(Doctors, Health and Medical),,,,,,,))
((Vw81qCWsEk4bFDJ1ibTKug,893 Marsh#496San Luis Obispo, CA 93401,List(Plumbing, Local
Services, Home Services, Appliances & Repair, Contractors),,,,,,))
((VT-9yjo8dp5K9CyEh6UTkQ,950 E Colorado BlvdSte 105PasadenaPasadena, CA
91106,List(Local Services, Dry Cleaning & Laundry),,,,,,,,))
((VxrdN2ySgx6 MYT2KKFhqw,2529 Telegraph AveTelegraph AveBerkeley, CA
94704, List (Women's Clothing, Fashion, Shopping, Accessories),,,,,,,))
((Vipthhye_sPOBmKLLPiR7Q,920 W. 28th StSouth Los AngelesLos Angeles, CA
90007,List(),,,,,,,))
((VfzrKmcuEGWZ7wBz6hFRXg,8843 Villa La Jolla DrLa Jolla, CA 92037,List(Food, Specialty Food,
Health Markets),,,,,,))
```

```
((VYsFC-bwU24kw_9pxOYIlg,779 Higuera StSan Luis Obispo, CA 93401,List(Women's Clothing, Fashion, Shopping),,,,,,,))

((W2oVJ3zFYgUStoQbnw799g,1135 Chorro StSan Luis Obispo, CA 93401,List(Leather Goods, Fashion, Shopping, Luggage),,,,,,))

((IOafOSjhoYRCzClqISAmng,940 W Washington BlvdSte BSouth Los AngelesLos Angeles, CA 90015,List(Local Services, Shopping, IT Services & Computer Repair, Office Equipment),,,,,,,))

Question 3:

File Loading for Business.csv and Review.csv:

//load business.csv file as a line
A = LOAD './kunal/business.csv' AS line;

// Now convert them into tuple
```

B= FOREACH A GENERATE FLATTEN((tuple(chararray,chararray,chararray)) REGEX_EXTRACT_ALL(line,'(.*)\\:\\:(.*)\)) AS (busid,add,categ);

D = FOREACH C GENERATE FLATTEN((tuple(chararray,chararray,float))
REGEX_EXTRACT_ALL(Line,'(.*)\\:\\:(.*)\\:\\:(.*)')) AS (reviewid,uid,bid,rating);

// Load review.csv file as a line

// Now convert them into tuple

//use co-group command

Final3 = limit A3 5

C = Load './kunal/review.csv' AS Line;

A3= cogroup B by busid, D by bid;

//Store result into input file Store Final3 into './kunal/Final3'

Output:

(--3iH7ezDwTGn5lolFMdhg,{(--3iH7ezDwTGn5lolFMdhg,201 South Estes DriveChapel Hill, NC 27514, List (Arts & Entertainment, Shopping, Arts & Crafts, Art Galleries, Antiques, Event Planning & Services, Cards & Stationery, Flowers & Gifts),,,,),(--3iH7ezDwTGn5lolFMdhg,201 South Estes DriveChapel Hill, NC 27514, List (Arts & Entertainment, Shopping, Arts & Crafts, Art Galleries, Antiques, Event Planning & Services, Cards & Stationery, Flowers & Gifts),,,,)},{(dL6wkEQaV2dILUc0lgbVNA,3x8lZ-EoBhg-mw21BRITuQ,--3iH7ezDwTGn5lolFMdhg,3.0),(6 YbOOpTCmilmDvxvM8ibw,w4xul4H66RB3zXnn9i3FzA,--3iH7ezDwTGn5lolFMdhg,3.0),(VpFzhSAp_lqJcoNkMD1WhQ,PnvmYnd8V2VUV6mZtZCDsg,--3iH7ezDwTGn5lolFMdhg,5.0),(ROhssA2WRvs-YLh8rMt8Rw,YrugcPqjHGVkrSXpozDowg,--3iH7ezDwTGn5lolFMdhg,4.0),(cGxCjYkVaLzxaToU1Vxzhw,ka7KtME7TQ53RzyNTMeqSw,--3iH7ezDwTGn5lolFMdhg,4.0),(KlsR94XsQqurXmxUkur7GQ,mZAyb8OSugvx6TLjTuZsZA,--3iH7ezDwTGn5lolFMdhg,3.0),(kuj-48E6vfJRmLk5sYRR3g,rz3TD2DfMAqt_qAVtfr4fw,--3iH7ezDwTGn5lolFMdhg,4.0),(jJNFSwrpK8SHJr8ac1ql5g,XBNtqhc72X57VK8GLNbsGg,--3iH7ezDwTGn5lolFMdhg,3.0),(YMDnMLK5ExaDNbnHRLYlPw,z 8hSF534l99A9K4Y9Y9Ug,--3iH7ezDwTGn5lolFMdhg,4.0),(xYTJlNNfLMalAFPKLhXGqA,D7ERu96F-7vBF3usfJsLtg,--3iH7ezDwTGn5lolFMdhg,4.0),(mJNBGPwq-X11jeLJTJm-IQ,xhmh67-uRtXXOBqweUU-hQ,--3iH7ezDwTGn5lolFMdhg,5.0)})

(--q0WbTS_Gl55W3bC4zmSA,{(--q0WbTS_Gl55W3bC4zmSA,Penn Student Health Services Bldg3535 Market StPowelton VillagePhiladelphia, PA 19104,List(Caribbean, Food Stands, Restaurants),,,,,,,,,,(--q0WbTS_Gl55W3bC4zmSA,Penn Student Health Services Bldg3535 Market StPowelton VillagePhiladelphia, PA 19104,List(Caribbean, Food Stands, Restaurants),,,,,,,,)},{(zOE5NDw-ayJ4-TOPgF68ew,r4_XcrRt08sADOdlT5ex3A,--q0WbTS_Gl55W3bC4zmSA,3.0),(fQXqmlkLWSs7LrU4YvDU0Q,j29l0Dyc1CsPqmnZDhw5iA,--q0WbTS_Gl55W3bC4zmSA,3.0)})

Oignv7MjKrgh7Q7bYRlUQ,5.0),(OHc9Navfz3NVfwd71BIVEg,3sD zguW9ym11WtpogrpKA,-0ignv7MjKrgh7Q7bYRlUQ,4.0),(Zdb-Hs9IsAUBuj54i62E Q,L59t-Q16xPO1nMBJdF10Cw,-Oignv7MjKrgh7Q7bYRlUQ,4.0),(6hZTsTk7KTPvFqPwHXiQtQ,FgnLdCE3q0MqIWgnAH3xtw,-Oiqnv7MjKrgh7Q7bYRlUQ,3.0),(eV5FepByAG2nM2JHWWr1KQ,MynPsTNuymjjaOPrktJ-Lw,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(M2bbd3BWuyZu0FBsX F6Rg,S3v2L43KNkKPNm IcZ3T7Q,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(70vDn9ChrnhEGvxzDjZfPQ,Z8Q6AZm63tM3eLz8vmdk9w,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(FBjcEb0Gl8RMmYQy376GrQ,DICLJDdq0HpvOVYR5mB4gA,-0ignv7MjKrgh7Q7bYRlUQ,3.0),(UelgsrdBuXLlWfhUlSep7w,FT391Uy9RWTtGjnBT3GaWg,-Oignv7MjKrgh7Q7bYRlUQ,5.0),(M1PSAb6YqppNBjE7Wfid2w,-BgA1XTbaPXwf-u2wVldRg,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(O5fxluv2jfy45_1T2l2grA,Ko01Bph_vOdLw0BGvn_Sew,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(7S7JQ0xuhdu2cEnAyiC3BA,PrhTTBCqqUe8XyyDAkjibQ,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(5Ciu7wRGnwQTLEnVCUTbHw,dbVPM79PiB3LbEd2Cgruug,-Oignv7MjKrgh7Q7bYRlUQ,4.0),(jc6SLXNIVSX VYVT9 kKw,SOudN4W5nZ1FJrYmSpy4wg,-0ignv7MjKrgh7Q7bYRlUQ,5.0),(Y7lkLFOuhEDnLJlkFppybQ,b6koSC5-v8tCggqtjaLWDw,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(72KBjK1plDHwWYsJswp8Cg,xZAYGYy0TDZhfh9U12gMQw,-Oignv7MjKrgh7Q7bYRlUQ,4.0),(zzdmx2M0oQJDkR 5LTaOVg,So-vBe5SOQNKuTz3dlJQ-w,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(g-WnSN-fbyglvuv7iLlw7w,8VN_WvKLfO2mLhq CcFS4A,-Oignv7MjKrgh7Q7bYRlUQ,5.0),(8zPnvTV tGWasdH8XrlaPA,lipTS Mn7OzuBlxT81DnBw,-0iqnv7MjKrgh7Q7bYRlUQ,3.0),(hwhxFLL51WP-sFAkxmAB9Q,NYUxw-2sgmckHYhjaJ71Ug,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(S5UOddCkFK-WY8F184XURA,vTG0INOo12YOf3VO8k0law,-Oiqnv7MjKrgh7Q7bYRlUQ,4.0),(gjv8tPJTq64VF2mxnVqSLg,5_BUeZJTfCWIPBJQ4FzZhA,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(sC3GWhOV0xQlqG1HTlf0kw,FtJQXNepCD-MVjNpJDYvlQ,-Oignv7MjKrgh7Q7bYRlUQ,4.0),(SaHYBQ1gfkOSJWbyDoQqxw,MZdxigKYlasxURDoIUQAww,-0iqnv7MjKrgh7Q7bYRlUQ,1.0),(fkgC9MZqxl9oWe4cXmRsCg,e0IAilTvU4Fu8r9BdbUEbA,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(dGwJYA5AoJmN9C8oAelovw,Oz9iH3kGLul1Blpedqmv9w,-Oignv7MjKrgh7Q7bYRlUQ,1.0),(Us2vNJbLonff1XsHoAJrYg,AsNTonKKhT6IPaJYrGtgYA,-0iqnv7MjKrgh7Q7bYRlUQ,3.0),(OdWyZNi9130GkiRxqA5isA,Bee_DFRkzrcJ_UOrcTlUtA,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(wcxo3CxQOQ5-w8qJzZGeHg,VyzEjq3r5vB4jslmH9le1A,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(JeIBh7RC3l9hZl7Gv6ZMTw,LvVHUSssykWeQIRVQk__6A,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(-Ri1ljrAFhOtDbW289XoFw,sxQxbJxveW1l8EYL3NbRdw,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(r3mT3GXzWOP58H p LnOJg,3kvDX mlAn UvUokuS0ihw,-0ignv7MjKrgh7Q7bYRlUQ,4.0),(RAB8mNXrvhhllxLKRleZmg,CGHocZ1nUt9ottLbDIPwWQ,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(5ntqdqgu LBlC7d7MRDo8g,dOOe5SS3imrr5NnGrmXhOg,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(BZPujrd_dpaDwd3h2MfZGQ,GPfRCySHYV1RnMYF-wCx2A,-Oignv7MjKrgh7Q7bYRlUQ,5.0),(BJCDdX1LxcsyP KejINC4w,3R43ydfitOG0B4e vuQyfA,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(plhThVwrlc34tiox2HW08w,-bCmpdLMmOPG_w25P287tA,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(mOk rJYdaCNoVIOTFCKVog,Y4Ls2nZ7Jn0aG TQZ5q2yw,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(5HLVW5DlLgfdTJQ6oODO7w,532U4v08MWH7t2S19smYPQ,-0iqnv7MjKrgh7Q7bYRlUQ,4.0),(XvrqwMn9Te3c9myIUF9xJQ,IORKDAmlj8Kq5Jp6I-5SaA,-0ignv7MjKrgh7Q7bYRlUQ,5.0),(38ckUUCSpqw-QHssWImVkg,ot0MNWuCMuE5KSuqd WqEg,-Oignv7MjKrgh7Q7bYRlUQ,5.0),(Dp1zb-uzOSuzgD7K 8PV0Q,eWbyza XypH-NsDJgyiLjw,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(5klw28mXgxC_F2EJqAuU6Q,Pox6gRJ5vm7m9DO4nuU-UA,-Oignv7MjKrgh7Q7bYRlUQ,4.0),(F9PkASkMZJlyNvOV2uVblQ,1eTFGszG nuIUbN0cHaWxA,-0iqnv7MjKrgh7Q7bYRlUQ,5.0),(0DVfsvKPKzpyq8BQvQRfYA,9VWEWnmUTdY8ygh5 Wlmpw,-

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Question 4:

File Loading for Business.csv and Review.csv:

```
//load business.csv file as a line
A = LOAD './kunal/business.csv' AS line;
// Now convert them into tuple
B= FOREACH A GENERATE FLATTEN((tuple(chararray,chararray)))
REGEX_EXTRACT_ALL(line,'(.*)\\:\\:(.*)\\)) AS (busid,add,categ);
// Load review.csv file as a line
C = Load './kunal/review.csv' AS Line;
// Now convert them into tuple
D = FOREACH C GENERATE FLATTEN((tuple(chararray,chararray,chararray,float))
REGEX_EXTRACT_ALL(Line,'(.*)\:(.*)\:(.*)')) AS (reviewid,uid,bid,rating);
// Filter file based on matches with Stanford
E = filter B by (add matches '.*Stanford.*');
//perform join operation
G = join E by busid, D by bid;
//Select Distinct operation
H = distinct G;
```

```
//Select top 10 results:

I = limit H 10;

//store final result:

Final4 = foreach I generate(uid,rating);

Store Final4 into '.kunal/Final4';

Dump Final4;
```

OUTPUT:

((qzbcVuTy_Ug_Qej3-u11cQ,5.0)) ((g9imXaXdU9qjYMsCy0KoHA,2.0)) ((06gL9VaAyAl6WoYVu_nPuA,4.0)) ((RUMwNN5U7RRPsEOmeAdBDQ,5.0)) ((Eva274V0UhvqY4owmBEu9w,4.0)) ((RxaqMFylRmftGzihOQTmfg,5.0)) ((vB8YCXg61Knx81tZ-E180A,3.0)) ((uKprY5zjYtPTya8mYK4N-Q,4.0)) ((BFIaTEKz0kUoo9WZNIdPJQ,5.0)) ((cL-AqfiZcGRwkyfxRomGvw,5.0))