

Lab_6_Challenge

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```
library(dplyr)
```

```
##
```

```
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
```

```
##
```

```
## filter, lag
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
## intersect, setdiff, setequal, union
```

```
my_data <- read.csv("C:/Users/Janice/Documents/R/introdatascience/Lab/incomeData.csv")
```

(a) Choose the 2nd variable (state) from the original dataset combine it with its capital and its nickname. The state nickname is given below. Exclude from your original dataset “District of Columbia” row 9, as it is not a state in USA but its capital city.

```
data <- select(my_data, State)
```

```
data <- filter(data, State != "District of Columbia")
```

```
data <- select(data, State)
```

```
data
```

```
## State
```

```
## 1 Alabama
```

```
## 2 Alaska
```

```
## 3 Arizona
```

```
## 4 Arkansas
```

```
## 5 California
```

```
## 6 Colorado
```

```
## 7 Connecticut
```

```
## 8 Delaware
```

```
## 9 Florida
```

```
## 10 Georgia
```

```
## 11 Hawaii
```

```
## 12 Idaho
```

```
## 13 Illinois
```

```
## 14      Indiana
## 15      Iowa
## 16      Kansas
## 17      Kentucky
## 18      Louisiana
## 19      Maine
## 20      Maryland
## 21 Massachusetts
## 22      Michigan
## 23      Minnesota
## 24      Mississippi
## 25      Missouri
## 26      Montana
## 27      Nebraska
## 28      Nevada
## 29 New Hampshire
## 30      New Jersey
## 31      New Mexico
## 32      New York
## 33 North Carolina
## 34      North Dakota
## 35      Ohio
## 36      Oklahoma
## 37      Oregon
## 38      Pennsylvania
## 39      Rhode Island
## 40 South Carolina
## 41      South Dakota
## 42      Tennessee
## 43      Texas
## 44      Utah
## 45      Vermont
## 46      Virginia
## 47      Washington
## 48 West Virginia
## 49      Wisconsin
## 50      Wyoming
```

```
vecNick <- c("Cotton State, Yellowhammer State",
             "The Last Frontier",
             "Grand Canyon State", "Natural State",
             "Golden State", "Centennial State",
             "Nutmeg State, Constitution State",
             "First State, Diamond State", "Sunshine State",
             "Peach State, Empire State of the South",
             "Aloha State", "Gem State",
             "Prairie State, Land of Lincoln", "Hoosier State",
             "Hawkeye State, Corn State",
             "Sunflower State, Jayhawker State",
             "Bluegrass State",
             "Pelican State, Creole State, Sugar State",
             "Pine Tree State", "Free State, Old Line State",
             "Bay State, Old Colony State",
             "Wolverine State, Great Lake State",
```

```

"North Star State, Gopher State, Land of 10,000 Lakes, Land of Sky-Blue Waters", "Magnolia
"Show Me State",
"Treasure State, Big Sky Country",
"Cornhusker State, Beef State",
"Silver State, Sagebrush State, Battle Born State",
"Granite State", "Garden State",
"Land of Enchantment, Sunshine State",
"Empire State",
"Tar Heel State, Old North State",
"Flickertail State, Sioux State, Peace Garden State",
"Buckeye State", "Sooner State", "Beaver State",
"Keystone State", "Ocean State, Little Rhody",
"Palmetto State", "The Mount Rushmore State",
"Volunteer State", "Lone Star State",
"Beehive State", "Green Mountain State",
"The Old Dominion, Mother of Presidents",
"Evergreen State, Chinook State",
"Mountain State",
"Badger State, America's Dairyland",
"Equality State")
vecCap <- c("Montgomery", "Juneau", "Phoenix", "Little Rock",
"Sacramento", "Denver", "Hartford", "Dover",
"Tallahassee", "Atlanta", "Honolulu", "Boise",
"Springfield", "Indianapolis", "Des Moines",
"Topeka", "Frankfort", "Baton Rouge",
"Augusta", "Annapolis", "Boston", "Lansing",
"Saint Paul", "Jackson", "Jefferson City", "Helena",
"Lincoln", "Carson City", "Concord", "Trenton",
"Santa Fe", "Albany", "Raleigh", "Bismarck",
"Columbus", "Oklahoma City", "Salem", "Harrisburg",
"Providence", "Columbia", "Pierre", "Nashville",
"Austin", "Salt Lake City", "Montpelier", "Richmond",
"Olympia", "Charleston", "Madison", "Cheyenne")
df <- data.frame(Capital = vecCap, Nickname = vecNick)
df

```

```

##      Capital
## 1    Montgomery
## 2      Juneau
## 3      Phoenix
## 4    Little Rock
## 5    Sacramento
## 6      Denver
## 7    Hartford
## 8      Dover
## 9    Tallahassee
## 10     Atlanta
## 11     Honolulu
## 12      Boise
## 13    Springfield
## 14    Indianapolis
## 15     Des Moines
## 16      Topeka
## 17    Frankfort

```

18 Baton Rouge
 ## 19 Augusta
 ## 20 Annapolis
 ## 21 Boston
 ## 22 Lansing
 ## 23 Saint Paul
 ## 24 Jackson
 ## 25 Jefferson City
 ## 26 Helena
 ## 27 Lincoln
 ## 28 Carson City
 ## 29 Concord
 ## 30 Trenton
 ## 31 Santa Fe
 ## 32 Albany
 ## 33 Raleigh
 ## 34 Bismarck
 ## 35 Columbus
 ## 36 Oklahoma City
 ## 37 Salem
 ## 38 Harrisburg
 ## 39 Providence
 ## 40 Columbia
 ## 41 Pierre
 ## 42 Nashville
 ## 43 Austin
 ## 44 Salt Lake City
 ## 45 Montpelier
 ## 46 Richmond
 ## 47 Olympia
 ## 48 Charleston
 ## 49 Madison
 ## 50 Cheyenne

##	Nickname
## 1	Cotton State, Yellowhammer State
## 2	The Last Frontier
## 3	Grand Canyon State
## 4	Natural State
## 5	Golden State
## 6	Centennial State
## 7	Nutmeg State, Constitution State
## 8	First State, Diamond State
## 9	Sunshine State
## 10	Peach State, Empire State of the South
## 11	Aloha State
## 12	Gem State
## 13	Prairie State, Land of Lincoln
## 14	Hoosier State
## 15	Hawkeye State, Corn State
## 16	Sunflower State, Jayhawker State
## 17	Bluegrass State
## 18	Pelican State, Creole State, Sugar State
## 19	Pine Tree State
## 20	Free State, Old Line State

```

## 21                               Bay State, Old Colony State
## 22                               Wolverine State, Great Lake State
## 23 North Star State, Gopher State, Land of 10,000 Lakes, Land of Sky-Blue Waters
## 24                               Magnolia State
## 25                               Show Me State
## 26                               Treasure State, Big Sky Country
## 27                               Cornhusker State, Beef State
## 28                               Silver State, Sagebrush State, Battle Born State
## 29                               Granite State
## 30                               Garden State
## 31                               Land of Enchantment, Sunshine State
## 32                               Empire State
## 33                               Tar Heel State, Old North State
## 34                               Flickertail State, Sioux State, Peace Garden State
## 35                               Buckeye State
## 36                               Sooner State
## 37                               Beaver State
## 38                               Keystone State
## 39                               Ocean State, Little Rhody
## 40                               Palmetto State
## 41                               The Mount Rushmore State
## 42                               Volunteer State
## 43                               Lone Star State
## 44                               Beehive State
## 45                               Green Mountain State
## 46                               The Old Dominion, Mother of Presidents
## 47                               Evergreen State, Chinook State
## 48                               Mountain State
## 49                               Badger State, America's Dairyland
## 50                               Equality State

```

```

df2 <- data.frame(data)
finalDf <- cbind(df2, df)
finalDf

```

```

##           State           Capital
## 1      Alabama    Montgomery
## 2       Alaska      Juneau
## 3      Arizona      Phoenix
## 4      Arkansas    Little Rock
## 5    California    Sacramento
## 6      Colorado      Denver
## 7    Connecticut    Hartford
## 8      Delaware      Dover
## 9      Florida    Tallahassee
## 10     Georgia      Atlanta
## 11     Hawaii      Honolulu
## 12     Idaho       Boise
## 13    Illinois    Springfield
## 14    Indiana    Indianapolis
## 15      Iowa      Des Moines
## 16     Kansas      Topeka
## 17    Kentucky    Frankfort
## 18   Louisiana    Baton Rouge

```

## 19	Maine	Augusta
## 20	Maryland	Annapolis
## 21	Massachusetts	Boston
## 22	Michigan	Lansing
## 23	Minnesota	Saint Paul
## 24	Mississippi	Jackson
## 25	Missouri	Jefferson City
## 26	Montana	Helena
## 27	Nebraska	Lincoln
## 28	Nevada	Carson City
## 29	New Hampshire	Concord
## 30	New Jersey	Trenton
## 31	New Mexico	Santa Fe
## 32	New York	Albany
## 33	North Carolina	Raleigh
## 34	North Dakota	Bismarck
## 35	Ohio	Columbus
## 36	Oklahoma	Oklahoma City
## 37	Oregon	Salem
## 38	Pennsylvania	Harrisburg
## 39	Rhode Island	Providence
## 40	South Carolina	Columbia
## 41	South Dakota	Pierre
## 42	Tennessee	Nashville
## 43	Texas	Austin
## 44	Utah	Salt Lake City
## 45	Vermont	Montpelier
## 46	Virginia	Richmond
## 47	Washington	Olympia
## 48	West Virginia	Charleston
## 49	Wisconsin	Madison
## 50	Wyoming	Cheyenne

##	Nickname
## 1	Cotton State, Yellowhammer State
## 2	The Last Frontier
## 3	Grand Canyon State
## 4	Natural State
## 5	Golden State
## 6	Centennial State
## 7	Nutmeg State, Constitution State
## 8	First State, Diamond State
## 9	Sunshine State
## 10	Peach State, Empire State of the South
## 11	Aloha State
## 12	Gem State
## 13	Prairie State, Land of Lincoln
## 14	Hoosier State
## 15	Hawkeye State, Corn State
## 16	Sunflower State, Jayhawker State
## 17	Bluegrass State
## 18	Pelican State, Creole State, Sugar State
## 19	Pine Tree State
## 20	Free State, Old Line State
## 21	Bay State, Old Colony State

```

## 22                               Wolverine State, Great Lake State
## 23 North Star State, Gopher State, Land of 10,000 Lakes, Land of Sky-Blue Waters
## 24                               Magnolia State
## 25                               Show Me State
## 26                               Treasure State, Big Sky Country
## 27                               Cornhusker State, Beef State
## 28                               Silver State, Sagebrush State, Battle Born State
## 29                               Granite State
## 30                               Garden State
## 31                               Land of Enchantment, Sunshine State
## 32                               Empire State
## 33                               Tar Heel State, Old North State
## 34                               Flickertail State, Sioux State, Peace Garden State
## 35                               Buckeye State
## 36                               Sooner State
## 37                               Beaver State
## 38                               Keystone State
## 39                               Ocean State, Little Rhody
## 40                               Palmetto State
## 41                               The Mount Rushmore State
## 42                               Volunteer State
## 43                               Lone Star State
## 44                               Beehive State
## 45                               Green Mountain State
## 46                               The Old Dominion, Mother of Presidents
## 47                               Evergreen State, Chinook State
## 48                               Mountain State
## 49                               Badger State, America's Dairyland
## 50                               Equality State

```

(b) Translate all the **THREE (3)** column names in (a) to Malay language.

```

finalDf <- rename(finalDf, Negeri = State, Ibu_Negeri = Capital, Nama_Samaran = Nickname)
finalDf

```

```

##           Negeri      Ibu_Negeri
## 1      Alabama  Montgomery
## 2       Alaska      Juneau
## 3      Arizona      Phoenix
## 4      Arkansas  Little Rock
## 5    California  Sacramento
## 6      Colorado      Denver
## 7    Connecticut  Hartford
## 8      Delaware      Dover
## 9      Florida  Tallahassee
## 10     Georgia      Atlanta
## 11     Hawaii      Honolulu
## 12     Idaho      Boise
## 13    Illinois  Springfield
## 14    Indiana  Indianapolis
## 15      Iowa      Des Moines
## 16     Kansas      Topeka

```

## 17	Kentucky	Frankfort
## 18	Louisiana	Baton Rouge
## 19	Maine	Augusta
## 20	Maryland	Annapolis
## 21	Massachusetts	Boston
## 22	Michigan	Lansing
## 23	Minnesota	Saint Paul
## 24	Mississippi	Jackson
## 25	Missouri	Jefferson City
## 26	Montana	Helena
## 27	Nebraska	Lincoln
## 28	Nevada	Carson City
## 29	New Hampshire	Concord
## 30	New Jersey	Trenton
## 31	New Mexico	Santa Fe
## 32	New York	Albany
## 33	North Carolina	Raleigh
## 34	North Dakota	Bismarck
## 35	Ohio	Columbus
## 36	Oklahoma	Oklahoma City
## 37	Oregon	Salem
## 38	Pennsylvania	Harrisburg
## 39	Rhode Island	Providence
## 40	South Carolina	Columbia
## 41	South Dakota	Pierre
## 42	Tennessee	Nashville
## 43	Texas	Austin
## 44	Utah	Salt Lake City
## 45	Vermont	Montpelier
## 46	Virginia	Richmond
## 47	Washington	Olympia
## 48	West Virginia	Charleston
## 49	Wisconsin	Madison
## 50	Wyoming	Cheyenne

##	Nama_Samaran
## 1	Cotton State, Yellowhammer State
## 2	The Last Frontier
## 3	Grand Canyon State
## 4	Natural State
## 5	Golden State
## 6	Centennial State
## 7	Nutmeg State, Constitution State
## 8	First State, Diamond State
## 9	Sunshine State
## 10	Peach State, Empire State of the South
## 11	Aloha State
## 12	Gem State
## 13	Prairie State, Land of Lincoln
## 14	Hoosier State
## 15	Hawkeye State, Corn State
## 16	Sunflower State, Jayhawker State
## 17	Bluegrass State
## 18	Pelican State, Creole State, Sugar State
## 19	Pine Tree State


```

## 20                                Free State, Old Line State
## 21                                Bay State, Old Colony State
## 22                                Wolverine State, Great Lake State
## 23 North Star State, Gopher State, Land of 10,000 Lakes, Land of Sky-Blue Waters
## 24                                Magnolia State
## 25                                Show Me State
## 26                                Treasure State, Big Sky Country
## 27                                Cornhusker State, Beef State
## 28                                Silver State, Sagebrush State, Battle Born State
## 29                                Granite State
## 30                                Garden State
## 31                                Land of Enchantment, Sunshine State
## 32                                Empire State
## 33                                Tar Heel State, Old North State
## 34                                Flickertail State, Sioux State, Peace Garden State
## 35                                Buckeye State
## 36                                Sooner State
## 37                                Beaver State
## 38                                Keystone State
## 39                                Ocean State, Little Rhody
## 40                                Palmetto State
## 41                                The Mount Rushmore State
## 42                                Volunteer State
## 43                                Lone Star State
## 44                                Beehive State
## 45                                Green Mountain State
## 46                                The Old Dominion, Mother of Presidents
## 47                                Evergreen State, Chinook State
## 48                                Mountain State
## 49                                Badger State, America's Dairyland
## 50                                Equality State

```

(c) Find the average income for each state from the year 2005 – 2015 and add the average income to the dataset. You may want to exclude 2002 to 2004 from the dataset.

```

dataInc <- filter(my_data, State != "District of Columbia")
dataInc

```

##	Index	State	Y2002	Y2003	Y2004	Y2005	Y2006	Y2007	Y2008
## 1	A	Alabama	1296530	1317711	1118631	1492583	1107408	1440134	1945229
## 2	A	Alaska	1170302	1960378	1818085	1447852	1861639	1465841	1551826
## 3	A	Arizona	1742027	1968140	1377583	1782199	1102568	1109382	1752886
## 4	A	Arkansas	1485531	1994927	1119299	1947979	1669191	1801213	1188104
## 5	C	California	1685349	1675807	1889570	1480280	1735069	1812546	1487315
## 6	C	Colorado	1343824	1878473	1886149	1236697	1871471	1814218	1875146
## 7	C	Connecticut	1610512	1232844	1181949	1518933	1841266	1976976	1764457
## 8	D	Delaware	1330403	1268673	1706751	1403759	1441351	1300836	1762096
## 9	F	Florida	1964626	1468852	1419738	1362787	1339608	1278550	1756185
## 10	G	Georgia	1929009	1541565	1810773	1779091	1326846	1223770	1773090
## 11	H	Hawaii	1461570	1200280	1213993	1245931	1459383	1430465	1919423
## 12	I	Idaho	1353210	1438538	1739154	1541015	1122387	1772050	1335481
## 13	I	Illinois	1508356	1527440	1493029	1261353	1540274	1747614	1871645

## 14	I	Indiana	1776918	1734104	1269927	1204117	1848073	1129546	1139551
## 15	I	Iowa	1499269	1444576	1576367	1388924	1554813	1452911	1317983
## 16	K	Kansas	1509054	1290700	1522230	1532094	1104256	1863278	1949478
## 17	K	Kentucky	1813878	1448846	1800760	1250524	1137913	1911227	1301848
## 18	L	Louisiana	1584734	1110625	1868456	1751920	1233709	1920301	1185085
## 19	M	Maine	1582720	1678622	1208496	1912040	1438549	1330014	1295877
## 20	M	Maryland	1579713	1404700	1849798	1397738	1310270	1789128	1112765
## 21	M	Massachusetts	1647582	1686259	1620601	1777250	1531641	1380529	1978904
## 22	M	Michigan	1295635	1149931	1601027	1340716	1729449	1567494	1990431
## 23	M	Minnesota	1729921	1675204	1903907	1561839	1985692	1148621	1328133
## 24	M	Mississippi	1983285	1292558	1631325	1943311	1354579	1731643	1428291
## 25	M	Missouri	1221316	1858368	1773451	1573967	1374863	1486197	1735099
## 26	M	Montana	1877154	1540099	1332722	1273327	1625721	1983568	1251742
## 27	N	Nebraska	1885081	1309769	1425527	1240465	1500594	1278272	1140598
## 28	N	Nevada	1426117	1114500	1119707	1758830	1694526	1765826	1903270
## 29	N	New Hampshire	1419776	1854370	1195119	1990062	1645430	1286967	1762936
## 30	N	New Jersey	1605532	1141514	1613550	1181452	1541327	1156804	1568034
## 31	N	New Mexico	1819239	1226057	1935991	1124400	1723493	1475985	1237704
## 32	N	New York	1395149	1611371	1170675	1446810	1426941	1463171	1732098
## 33	N	North Carolina	1616742	1292223	1482792	1532347	1158716	1827420	1267737
## 34	N	North Dakota	1618807	1510193	1876940	1443172	1425030	1868788	1720352
## 35	O	Ohio	1802132	1648498	1441386	1670280	1534888	1314824	1516621
## 36	O	Oklahoma	1173918	1334639	1663622	1798714	1312574	1708245	1256746
## 37	O	Oregon	1794912	1726665	1805445	1133510	1502242	1419251	1482786
## 38	P	Pennsylvania	1320191	1446723	1218591	1122030	1971479	1563062	1274168
## 39	R	Rhode Island	1501744	1942942	1266657	1961923	1835983	1234040	1151409
## 40	S	South Carolina	1631522	1803455	1425193	1458191	1538731	1825195	1250499
## 41	S	South Dakota	1159037	1150689	1660148	1417141	1418586	1279134	1171870
## 42	T	Tennessee	1811867	1485909	1974179	1157059	1786132	1399191	1826406
## 43	T	Texas	1520591	1310777	1957713	1907326	1873544	1655483	1785986
## 44	U	Utah	1771096	1195861	1979395	1241662	1437456	1859416	1939284
## 45	V	Vermont	1146902	1832249	1492704	1579265	1332048	1563537	1123567
## 46	V	Virginia	1134317	1163996	1891068	1853855	1708715	1197698	1803330
## 47	W	Washington	1977749	1687136	1199490	1163092	1334864	1621989	1545621
## 48	W	West Virginia	1677347	1380662	1176100	1888948	1922085	1740826	1238174
## 49	W	Wisconsin	1788920	1518578	1289663	1436888	1251678	1721874	1980167
## 50	W	Wyoming	1775190	1498098	1198212	1881688	1750527	1523124	1587602
##	Y2009	Y2010	Y2011	Y2012	Y2013	Y2014	Y2015		
## 1	1944173	1237582	1440756	1186741	1852841	1558906	1916661		
## 2	1436541	1629616	1230866	1512804	1985302	1580394	1979143		
## 3	1554330	1300521	1130709	1907284	1363279	1525866	1647724		
## 4	1628980	1669295	1928238	1216675	1591896	1360959	1329341		
## 5	1663809	1624509	1639670	1921845	1156536	1388461	1644607		
## 6	1752387	1913275	1665877	1491604	1178355	1383978	1330736		
## 7	1972730	1968730	1945524	1228529	1582249	1503156	1718072		
## 8	1553585	1370984	1318669	1984027	1671279	1803169	1627508		
## 9	1818438	1198403	1497051	1131928	1107448	1407784	1170389		
## 10	1630325	1145473	1851245	1850111	1887157	1259353	1725470		
## 11	1928416	1330509	1902816	1695126	1517184	1948108	1150882		
## 12	1748608	1436809	1456340	1643855	1312561	1713718	1757171		
## 13	1658551	1422021	1751422	1696729	1915435	1645465	1583516		
## 14	1883976	1999102	1559924	1905760	1129794	1988394	1467614		
## 15	1150783	1751389	1992996	1501879	1173694	1431705	1641866		
## 16	1561528	1550433	1465812	1882929	1410249	1930090	1385528		

```
## 17 1956681 1350895 1512894 1916616 1878271 1722762 1913350
## 18 1124853 1498662 1210385 1234234 1287663 1908602 1403857
## 19 1969163 1627262 1706080 1437088 1318546 1116792 1529233
## 20 1967225 1486246 1872327 1175819 1314343 1979529 1569566
## 21 1567651 1761048 1658538 1482203 1731917 1669749 1963337
## 22 1575185 1267626 1274673 1709853 1815596 1965196 1646634
## 23 1890633 1995304 1575533 1910216 1972021 1515366 1864553
## 24 1568049 1383227 1629132 1988270 1907777 1649668 1991232
## 25 1800620 1164202 1425363 1800052 1698105 1767835 1996005
## 26 1592690 1350619 1520064 1185225 1465705 1110394 1125903
## 27 1270585 1128711 1187207 1569665 1690920 1459243 1802211
## 28 1231480 1526066 1143343 1980195 1283813 1225348 1903804
## 29 1763211 1265642 1704297 1131298 1197576 1242623 1963313
## 30 1357418 1443718 1390010 1202326 1100990 1850165 1183568
## 31 1820856 1801430 1653384 1475715 1623388 1533494 1868612
## 32 1426216 1604531 1683687 1500089 1718837 1619033 1367705
## 33 1116168 1791535 1553750 1472258 1104893 1596452 1229085
## 34 1671468 1534571 1271132 1430978 1529024 1563898 1604118
## 35 1511460 1585465 1887714 1227303 1840898 1880804 1573117
## 36 1853142 1673831 1822933 1674707 1900523 1956742 1307678
## 37 1862351 1103794 1935687 1905378 1522129 1509171 1893515
## 38 1571032 1433835 1483292 1290329 1475344 1931500 1668232
## 39 1993136 1983569 1781016 1909119 1531212 1990412 1611730
## 40 1864685 1345102 1116203 1532332 1591735 1188417 1110655
## 41 1852424 1554782 1647245 1811156 1147488 1302834 1136443
## 42 1326460 1231739 1469785 1849041 1560887 1349173 1162164
## 43 1827503 1447457 1978374 1882532 1698698 1646508 1705322
## 44 1915865 1619186 1288285 1108281 1123353 1801019 1729273
## 45 1618583 1326369 1792600 1714960 1146278 1282790 1565924
## 46 1590043 1516758 1171686 1262342 1647032 1706707 1850394
## 47 1555554 1179331 1150089 1775787 1273834 1387428 1377341
## 48 1539322 1539603 1872519 1462137 1683127 1204344 1198791
## 49 1901394 1648755 1940943 1729177 1510119 1701650 1846238
## 50 1504455 1282142 1881814 1673668 1994022 1204029 1853858
```

```
dataInc <- select(dataInc,Y2005:Y2015)
dataInc <- cbind(df2, dataInc)
dataInc
```

```
##           State  Y2005  Y2006  Y2007  Y2008  Y2009  Y2010  Y2011
## 1      Alabama 1492583 1107408 1440134 1945229 1944173 1237582 1440756
## 2       Alaska 1447852 1861639 1465841 1551826 1436541 1629616 1230866
## 3     Arizona 1782199 1102568 1109382 1752886 1554330 1300521 1130709
## 4   Arkansas 1947979 1669191 1801213 1188104 1628980 1669295 1928238
## 5   California 1480280 1735069 1812546 1487315 1663809 1624509 1639670
## 6    Colorado 1236697 1871471 1814218 1875146 1752387 1913275 1665877
## 7   Connecticut 1518933 1841266 1976976 1764457 1972730 1968730 1945524
## 8    Delaware 1403759 1441351 1300836 1762096 1553585 1370984 1318669
## 9     Florida 1362787 1339608 1278550 1756185 1818438 1198403 1497051
## 10    Georgia 1779091 1326846 1223770 1773090 1630325 1145473 1851245
## 11     Hawaii 1245931 1459383 1430465 1919423 1928416 1330509 1902816
## 12     Idaho 1541015 1122387 1772050 1335481 1748608 1436809 1456340
## 13   Illinois 1261353 1540274 1747614 1871645 1658551 1422021 1751422
## 14    Indiana 1204117 1848073 1129546 1139551 1883976 1999102 1559924
```

## 15	Iowa	1388924	1554813	1452911	1317983	1150783	1751389	1992996
## 16	Kansas	1532094	1104256	1863278	1949478	1561528	1550433	1465812
## 17	Kentucky	1250524	1137913	1911227	1301848	1956681	1350895	1512894
## 18	Louisiana	1751920	1233709	1920301	1185085	1124853	1498662	1210385
## 19	Maine	1912040	1438549	1330014	1295877	1969163	1627262	1706080
## 20	Maryland	1397738	1310270	1789128	1112765	1967225	1486246	1872327
## 21	Massachusetts	1777250	1531641	1380529	1978904	1567651	1761048	1658538
## 22	Michigan	1340716	1729449	1567494	1990431	1575185	1267626	1274673
## 23	Minnesota	1561839	1985692	1148621	1328133	1890633	1995304	1575533
## 24	Mississippi	1943311	1354579	1731643	1428291	1568049	1383227	1629132
## 25	Missouri	1573967	1374863	1486197	1735099	1800620	1164202	1425363
## 26	Montana	1273327	1625721	1983568	1251742	1592690	1350619	1520064
## 27	Nebraska	1240465	1500594	1278272	1140598	1270585	1128711	1187207
## 28	Nevada	1758830	1694526	1765826	1903270	1231480	1526066	1143343
## 29	New Hampshire	1990062	1645430	1286967	1762936	1763211	1265642	1704297
## 30	New Jersey	1181452	1541327	1156804	1568034	1357418	1443718	1390010
## 31	New Mexico	1124400	1723493	1475985	1237704	1820856	1801430	1653384
## 32	New York	1446810	1426941	1463171	1732098	1426216	1604531	1683687
## 33	North Carolina	1532347	1158716	1827420	1267737	1116168	1791535	1553750
## 34	North Dakota	1443172	1425030	1868788	1720352	1671468	1534571	1271132
## 35	Ohio	1670280	1534888	1314824	1516621	1511460	1585465	1887714
## 36	Oklahoma	1798714	1312574	1708245	1256746	1853142	1673831	1822933
## 37	Oregon	1133510	1502242	1419251	1482786	1862351	1103794	1935687
## 38	Pennsylvania	1122030	1971479	1563062	1274168	1571032	1433835	1483292
## 39	Rhode Island	1961923	1835983	1234040	1151409	1993136	1983569	1781016
## 40	South Carolina	1458191	1538731	1825195	1250499	1864685	1345102	1116203
## 41	South Dakota	1417141	1418586	1279134	1171870	1852424	1554782	1647245
## 42	Tennessee	1157059	1786132	1399191	1826406	1326460	1231739	1469785
## 43	Texas	1907326	1873544	1655483	1785986	1827503	1447457	1978374
## 44	Utah	1241662	1437456	1859416	1939284	1915865	1619186	1288285
## 45	Vermont	1579265	1332048	1563537	1123567	1618583	1326369	1792600
## 46	Virginia	1853855	1708715	1197698	1803330	1590043	1516758	1171686
## 47	Washington	1163092	1334864	1621989	1545621	1555554	1179331	1150089
## 48	West Virginia	1888948	1922085	1740826	1238174	1539322	1539603	1872519
## 49	Wisconsin	1436888	1251678	1721874	1980167	1901394	1648755	1940943
## 50	Wyoming	1881688	1750527	1523124	1587602	1504455	1282142	1881814
##	Y2012	Y2013	Y2014	Y2015				
## 1	1186741	1852841	1558906	1916661				
## 2	1512804	1985302	1580394	1979143				
## 3	1907284	1363279	1525866	1647724				
## 4	1216675	1591896	1360959	1329341				
## 5	1921845	1156536	1388461	1644607				
## 6	1491604	1178355	1383978	1330736				
## 7	1228529	1582249	1503156	1718072				
## 8	1984027	1671279	1803169	1627508				
## 9	1131928	1107448	1407784	1170389				
## 10	1850111	1887157	1259353	1725470				
## 11	1695126	1517184	1948108	1150882				
## 12	1643855	1312561	1713718	1757171				
## 13	1696729	1915435	1645465	1583516				
## 14	1905760	1129794	1988394	1467614				
## 15	1501879	1173694	1431705	1641866				
## 16	1882929	1410249	1930090	1385528				
## 17	1916616	1878271	1722762	1913350				

```
## 18 1234234 1287663 1908602 1403857
## 19 1437088 1318546 1116792 1529233
## 20 1175819 1314343 1979529 1569566
## 21 1482203 1731917 1669749 1963337
## 22 1709853 1815596 1965196 1646634
## 23 1910216 1972021 1515366 1864553
## 24 1988270 1907777 1649668 1991232
## 25 1800052 1698105 1767835 1996005
## 26 1185225 1465705 1110394 1125903
## 27 1569665 1690920 1459243 1802211
## 28 1980195 1283813 1225348 1903804
## 29 1131298 1197576 1242623 1963313
## 30 1202326 1100990 1850165 1183568
## 31 1475715 1623388 1533494 1868612
## 32 1500089 1718837 1619033 1367705
## 33 1472258 1104893 1596452 1229085
## 34 1430978 1529024 1563898 1604118
## 35 1227303 1840898 1880804 1573117
## 36 1674707 1900523 1956742 1307678
## 37 1905378 1522129 1509171 1893515
## 38 1290329 1475344 1931500 1668232
## 39 1909119 1531212 1990412 1611730
## 40 1532332 1591735 1188417 1110655
## 41 1811156 1147488 1302834 1136443
## 42 1849041 1560887 1349173 1162164
## 43 1882532 1698698 1646508 1705322
## 44 1108281 1123353 1801019 1729273
## 45 1714960 1146278 1282790 1565924
## 46 1262342 1647032 1706707 1850394
## 47 1775787 1273834 1387428 1377341
## 48 1462137 1683127 1204344 1198791
## 49 1729177 1510119 1701650 1846238
## 50 1673668 1994022 1204029 1853858
```

```
dataInc$Average <- rowSums(dataInc[ ,
                             c(2:12)])/(ncol(dataInc)-1)
dataInc
```

```
##      State  Y2005  Y2006  Y2007  Y2008  Y2009  Y2010  Y2011
## 1  Alabama 1492583 1107408 1440134 1945229 1944173 1237582 1440756
## 2  Alaska  1447852 1861639 1465841 1551826 1436541 1629616 1230866
## 3  Arizona 1782199 1102568 1109382 1752886 1554330 1300521 1130709
## 4  Arkansas 1947979 1669191 1801213 1188104 1628980 1669295 1928238
## 5  California 1480280 1735069 1812546 1487315 1663809 1624509 1639670
## 6  Colorado 1236697 1871471 1814218 1875146 1752387 1913275 1665877
## 7  Connecticut 1518933 1841266 1976976 1764457 1972730 1968730 1945524
## 8  Delaware 1403759 1441351 1300836 1762096 1553585 1370984 1318669
## 9  Florida  1362787 1339608 1278550 1756185 1818438 1198403 1497051
## 10 Georgia 1779091 1326846 1223770 1773090 1630325 1145473 1851245
## 11 Hawaii   1245931 1459383 1430465 1919423 1928416 1330509 1902816
## 12 Idaho    1541015 1122387 1772050 1335481 1748608 1436809 1456340
## 13 Illinois 1261353 1540274 1747614 1871645 1658551 1422021 1751422
## 14 Indiana  1204117 1848073 1129546 1139551 1883976 1999102 1559924
## 15 Iowa     1388924 1554813 1452911 1317983 1150783 1751389 1992996
```

## 16	Kansas	1532094	1104256	1863278	1949478	1561528	1550433	1465812
## 17	Kentucky	1250524	1137913	1911227	1301848	1956681	1350895	1512894
## 18	Louisiana	1751920	1233709	1920301	1185085	1124853	1498662	1210385
## 19	Maine	1912040	1438549	1330014	1295877	1969163	1627262	1706080
## 20	Maryland	1397738	1310270	1789128	1112765	1967225	1486246	1872327
## 21	Massachusetts	1777250	1531641	1380529	1978904	1567651	1761048	1658538
## 22	Michigan	1340716	1729449	1567494	1990431	1575185	1267626	1274673
## 23	Minnesota	1561839	1985692	1148621	1328133	1890633	1995304	1575533
## 24	Mississippi	1943311	1354579	1731643	1428291	1568049	1383227	1629132
## 25	Missouri	1573967	1374863	1486197	1735099	1800620	1164202	1425363
## 26	Montana	1273327	1625721	1983568	1251742	1592690	1350619	1520064
## 27	Nebraska	1240465	1500594	1278272	1140598	1270585	1128711	1187207
## 28	Nevada	1758830	1694526	1765826	1903270	1231480	1526066	1143343
## 29	New Hampshire	1990062	1645430	1286967	1762936	1763211	1265642	1704297
## 30	New Jersey	1181452	1541327	1156804	1568034	1357418	1443718	1390010
## 31	New Mexico	1124400	1723493	1475985	1237704	1820856	1801430	1653384
## 32	New York	1446810	1426941	1463171	1732098	1426216	1604531	1683687
## 33	North Carolina	1532347	1158716	1827420	1267737	1116168	1791535	1553750
## 34	North Dakota	1443172	1425030	1868788	1720352	1671468	1534571	1271132
## 35	Ohio	1670280	1534888	1314824	1516621	1511460	1585465	1887714
## 36	Oklahoma	1798714	1312574	1708245	1256746	1853142	1673831	1822933
## 37	Oregon	1133510	1502242	1419251	1482786	1862351	1103794	1935687
## 38	Pennsylvania	1122030	1971479	1563062	1274168	1571032	1433835	1483292
## 39	Rhode Island	1961923	1835983	1234040	1151409	1993136	1983569	1781016
## 40	South Carolina	1458191	1538731	1825195	1250499	1864685	1345102	1116203
## 41	South Dakota	1417141	1418586	1279134	1171870	1852424	1554782	1647245
## 42	Tennessee	1157059	1786132	1399191	1826406	1326460	1231739	1469785
## 43	Texas	1907326	1873544	1655483	1785986	1827503	1447457	1978374
## 44	Utah	1241662	1437456	1859416	1939284	1915865	1619186	1288285
## 45	Vermont	1579265	1332048	1563537	1123567	1618583	1326369	1792600
## 46	Virginia	1853855	1708715	1197698	1803330	1590043	1516758	1171686
## 47	Washington	1163092	1334864	1621989	1545621	1555554	1179331	1150089
## 48	West Virginia	1888948	1922085	1740826	1238174	1539322	1539603	1872519
## 49	Wisconsin	1436888	1251678	1721874	1980167	1901394	1648755	1940943
## 50	Wyoming	1881688	1750527	1523124	1587602	1504455	1282142	1881814
##	Y2012	Y2013	Y2014	Y2015	Average			
## 1	1186741	1852841	1558906	1916661	1556638			
## 2	1512804	1985302	1580394	1979143	1607439			
## 3	1907284	1363279	1525866	1647724	1470613			
## 4	1216675	1591896	1360959	1329341	1575625			
## 5	1921845	1156536	1388461	1644607	1595877			
## 6	1491604	1178355	1383978	1330736	1592159			
## 7	1228529	1582249	1503156	1718072	1729147			
## 8	1984027	1671279	1803169	1627508	1567024			
## 9	1131928	1107448	1407784	1170389	1369870			
## 10	1850111	1887157	1259353	1725470	1586539			
## 11	1695126	1517184	1948108	1150882	1593477			
## 12	1643855	1312561	1713718	1757171	1530909			
## 13	1696729	1915435	1645465	1583516	1644911			
## 14	1905760	1129794	1988394	1467614	1568714			
## 15	1501879	1173694	1431705	1641866	1487177			
## 16	1882929	1410249	1930090	1385528	1603243			
## 17	1916616	1878271	1722762	1913350	1622998			
## 18	1234234	1287663	1908602	1403857	1432661			

```
## 19 1437088 1318546 1116792 1529233 1516422
## 20 1175819 1314343 1979529 1569566 1543178
## 21 1482203 1731917 1669749 1963337 1682070
## 22 1709853 1815596 1965196 1646634 1625714
## 23 1910216 1972021 1515366 1864553 1704356
## 24 1988270 1907777 1649668 1991232 1688653
## 25 1800052 1698105 1767835 1996005 1620210
## 26 1185225 1465705 1110394 1125903 1407723
## 27 1569665 1690920 1459243 1802211 1388043
## 28 1980195 1283813 1225348 1903804 1583318
## 29 1131298 1197576 1242623 1963313 1541214
## 30 1202326 1100990 1850165 1183568 1361437
## 31 1475715 1623388 1533494 1868612 1576224
## 32 1500089 1718837 1619033 1367705 1544465
## 33 1472258 1104893 1596452 1229085 1422760
## 34 1430978 1529024 1563898 1604118 1551139
## 35 1227303 1840898 1880804 1573117 1594852
## 36 1674707 1900523 1956742 1307678 1660530
## 37 1905378 1522129 1509171 1893515 1569983
## 38 1290329 1475344 1931500 1668232 1525846
## 39 1909119 1531212 1990412 1611730 1725777
## 40 1532332 1591735 1188417 1110655 1438340
## 41 1811156 1147488 1302834 1136443 1430828
## 42 1849041 1560887 1349173 1162164 1465276
## 43 1882532 1698698 1646508 1705322 1764430
## 44 1108281 1123353 1801019 1729273 1551189
## 45 1714960 1146278 1282790 1565924 1458720
## 46 1262342 1647032 1706707 1850394 1573505
## 47 1775787 1273834 1387428 1377341 1396812
## 48 1462137 1683127 1204344 1198791 1571807
## 49 1729177 1510119 1701650 1846238 1697171
## 50 1673668 1994022 1204029 1853858 1648812
```

(d) Extract rows based on (c) for top 5 highest income states & top 5 lowest income states

```
top5 <- dataInc %>% arrange(desc(Average)) %>% slice(1:5)
top5 <- select(top5, State, Average)
top5
```

```
##      State Average
## 1      Texas 1764430
## 2 Connecticut 1729147
## 3 Rhode Island 1725777
## 4   Minnesota 1704356
## 5   Wisconsin 1697171
```

```
bottom5 <- dataInc %>% arrange(Average) %>% slice(1:5) %>% select(State, Average)
#bottom5 <- select(bottom5, State, Average)
bottom5
```

```
##      State Average
```

1 New Jersey 1361437
2 Florida 1369870
3 Nebraska 1388043
4 Washington 1396812
5 Montana 1407723