**Reading workbooks/datasets**

>Transactions <- read\_excel("C:/Internships Taken/KPMG/Data Quality Assessment/task 1/KPMG\_VI\_New\_raw\_data\_update\_final.xlsx", sheet = "Transactions")

> NewCustomerList <- read\_excel("C:/Internships Taken/KPMG/Data Quality Assessment/task 1/KPMG\_VI\_New\_raw\_data\_update\_final.xlsx", sheet = "NewCustomerList")

>CustomerDemographic <- read\_excel("C:/Internships Taken/KPMG/Data Quality Assessment/task 1/KPMG\_VI\_New\_raw\_data\_update\_final.xlsx", sheet = "CustomerDemographic")

> CustomerAddress <- read\_excel("C:/Internships Taken/KPMG/Data Quality Assessment/task 1/KPMG\_VI\_New\_raw\_data\_update\_final.xlsx", sheet = "CustomerAddress")

data[!complete.cases(data),]

// count of missing values for each worksheet

sum(is.na(Transactions))

sum(is.na(NewCustomerList))

sum(is.na(CustomerDemographic))

// # find location of missing values column wise from each worksheet

**which(is.na(Transactions$transaction\_id))**

**// at once find missing values in worksheet for all columns**

* sapply(Transactions, function(Transactions) which(is.na(Transactions)))
* or sapply(Transactions, function(x) sum(is.na(x)))

// **#count total missing values in entire worksheet**

**sum(is.na(Transactions))**

// plot missing values in each worksheet

barplot(sapply(Transactions, function(x) sum(is.na(x))),main="Transactions Dataset Completeness Details",names.arg = colnames(Transactions),col="Red",legend.text = "Missing Count",las=2)

or

<https://www.learnbyexample.org/r-bar-plot-base-graph/>

<https://r-graph-gallery.com/210-custom-barplot-layout.html>

data=(sapply(Transactions, function(x) sum(is.na(x))))

details=names(as.list(data))

par(mar=c(11,4,4,4))

plot=barplot(data,main="Transactions Dataset Completeness Details",names.arg = details,col="Red",legend.text = "Missing Count",las=2)

text(plot,data,label=as.character(values),pos=3)

### [Count Unique Values in R](https://www.geeksforgeeks.org/count-unique-values-in-r/" \l ":~:text=Method%201%3A%20Using%20length(unique,function%20can%20calculate%20the%20frequency.)

length(unique(CustomerAddress$customer\_id))

Findings for Datasets : NewCustomerList, CustomerDemographic, Transactions

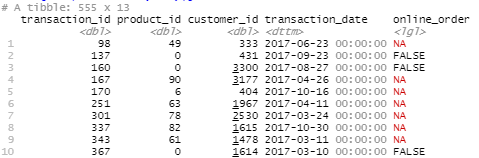


NewCustomerList Dataset: Shows irrevent column fields numbered from 17 to 21 which has no significance/meaning. Column description can not be numbers.

CustomerDemographic Dataset :Shows irrevant data with column description as default. It gives no meaning.

Transactions Dataset: Shows total 101 unique entries for product\_id. For every transation\_id it has to be different.

Overall missing data: following fields seems to have an issue



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Accuracy | Completeness | Consistency | Currency | Relevancy | Validity | Uniqueness |
|  | Correct Values | Total Data Fields with missing values | Values free from Contradiction | Values Up to Date | Data Items with Value MetaData | Allowable Values | Duplicate Data |
| Transactions |  | 1542 | Product\_id seems to have duplicate entries. Each Transaction id should have unique Product\_id value |  | product\_first\_sold\_date is not of Date Type |  | Product\_id seems to have duplicate entries. Each Transaction id should have unique Product\_id value |
| NewCustomerList | Incorrect DOB | 152 |  |  | Incorrect DOB | Incorrect DOB |  |
| Customer  Demographic | Incorrect DOB  column with Default as name has no meaning | 1045 | Default column? | Default column? | Incorrect DOB  column with Default as name has no meaning | Incorrect DOB  Default column? |  |
| CustomerAddress |  | 0 |  |  |  |  |  |

Completeness

Transaction:

|  |
| --- |
| $transaction\_id  integer(0)  $product\_id  integer(0)  $customer\_id  integer(0)  $transaction\_date  integer(0)  $online\_order  [1] 98 167 170 251 301 337 343 399 477 530 559  [12] 577 761 770 844 915 918 1061 1072 1160 1193 1201  [23] 1355 1362 1372 1382 1524 1553 1556 1622 1818 1888 1922  [34] 1938 1981 1988 2096 2214 2284 2390 2615 2618 2633 2647  [45] 2648 2773 2842 3026 3033 3135 3201 3454 3533 3554 3813  [56] 3905 3930 3955 3958 4044 4047 4051 4071 4162 4268 4344  [67] 4348 4385 4478 4654 4681 4754 4803 4822 4832 4867 4889  [78] 5022 5029 5062 5354 5416 5434 5455 5461 5476 5562 5575  [89] 5643 5673 5718 5743 5756 5802 5835 5888 5893 5964 5978  [100] 6038 6112 6148 6250 6356 6378 6400 6415 6467 6471 6475  [111] 6520 6573 6628 6687 6744 6785 6853 6896 7080 7257 7268  [122] 7323 7325 7379 7430 7460 7529 7676 7727 7777 7834 7955  [133] 7974 7998 8028 8029 8037 8041 8053 8074 8087 8116 8161  [144] 8165 8406 8453 8626 8694 8810 8866 8934 8950 9057 9180  [155] 9301 9345 9362 9368 9386 9447 9540 9658 9690 9706 9771  [166] 9802 9819 9934 9969 9996 10029 10035 10074 10095 10139 10176  [177] 10185 10254 10299 10368 10373 10437 10455 10478 10501 10579 10698  [188] 10788 10800 10857 11016 11108 11156 11161 11271 11324 11620 11675  [199] 11698 11711 11755 11913 11965 11985 12004 12073 12109 12302 12303  [210] 12320 12331 12403 12467 12503 12592 12617 12644 12678 12692 12711  [221] 12753 12758 12770 12790 12897 12918 12930 12934 13025 13057 13212  [232] 13223 13284 13292 13314 13357 13408 13439 13512 13531 13593 13631  [243] 13671 13706 13713 13826 13837 14060 14167 14187 14296 14316 14333  [254] 14429 14480 14545 14566 14575 14621 14642 14668 14761 14762 14795  [265] 14799 14869 14893 15030 15061 15066 15106 15112 15115 15165 15190  [276] 15242 15274 15304 15366 15374 15382 15446 15546 15711 15739 15758  [287] 15815 15825 15902 15942 15963 16021 16022 16046 16069 16076 16102  [298] 16161 16187 16222 16255 16285 16347 16506 16520 16548 16698 16725  [309] 16729 16744 16846 16853 16919 17061 17072 17085 17106 17164 17233  [320] 17335 17415 17435 17560 17716 17734 17862 17890 18011 18023 18043  [331] 18069 18086 18336 18472 18502 18607 18625 18690 18712 18723 18752  [342] 18755 18822 18847 18983 19025 19083 19101 19272 19283 19304 19369  [353] 19370 19434 19496 19515 19574 19581 19636 19844  $order\_status  integer(0)  $brand  [1] 137 160 367 407 677 781 1004 1131 1197 1283 1654  [12] 1681 1753 1779 2187 2303 2948 2991 3195 3260 3409 3782  [23] 3878 4025 4074 4128 4223 4225 4228 4339 4405 4605 4653  [34] 4714 4833 4896 4967 5065 5159 5207 5261 5267 5603 5862  [45] 6072 6138 6168 6251 6269 6419 6430 6500 6596 6644 6675  [56] 6933 6961 6988 7016 7047 7206 7235 7356 7610 7695 7730  [67] 7735 7780 7851 7949 8160 8216 8298 8322 8329 8424 8486  [78] 8527 8586 8610 8611 8925 8956 9187 9231 9276 9326 9420  [89] 9454 9479 9630 9715 9760 10002 10045 10541 10896 10960 11016  [100] 11116 11219 11393 11518 11531 11549 11834 11843 12022 12072 12139  [111] 12206 12323 12344 12347 12462 12817 12870 12912 12969 13011 13025  [122] 13028 13141 13344 13345 13369 13380 13460 13520 13594 13660 13681  [133] 13720 13739 13809 13849 13873 14228 14305 14410 14423 14444 14608  [144] 14641 14755 14836 14846 14922 15148 15268 15529 15622 15709 15928  [155] 16003 16010 16033 16095 16249 16289 16497 16661 16682 16767 16907  [166] 16935 17150 17236 17292 17332 17432 17535 17768 17919 17988 18022  [177] 18052 18245 18278 18280 18345 18493 18544 18554 18779 18820 19018  [188] 19046 19133 19177 19197 19206 19341 19384 19794 19860 19872  $product\_line  [1] 137 160 367 407 677 781 1004 1131 1197 1283 1654  [12] 1681 1753 1779 2187 2303 2948 2991 3195 3260 3409 3782  [23] 3878 4025 4074 4128 4223 4225 4228 4339 4405 4605 4653  [34] 4714 4833 4896 4967 5065 5159 5207 5261 5267 5603 5862  [45] 6072 6138 6168 6251 6269 6419 6430 6500 6596 6644 6675  [56] 6933 6961 6988 7016 7047 7206 7235 7356 7610 7695 7730  [67] 7735 7780 7851 7949 8160 8216 8298 8322 8329 8424 8486  [78] 8527 8586 8610 8611 8925 8956 9187 9231 9276 9326 9420  [89] 9454 9479 9630 9715 9760 10002 10045 10541 10896 10960 11016  [100] 11116 11219 11393 11518 11531 11549 11834 11843 12022 12072 12139  [111] 12206 12323 12344 12347 12462 12817 12870 12912 12969 13011 13025  [122] 13028 13141 13344 13345 13369 13380 13460 13520 13594 13660 13681  [133] 13720 13739 13809 13849 13873 14228 14305 14410 14423 14444 14608  [144] 14641 14755 14836 14846 14922 15148 15268 15529 15622 15709 15928  [155] 16003 16010 16033 16095 16249 16289 16497 16661 16682 16767 16907  [166] 16935 17150 17236 17292 17332 17432 17535 17768 17919 17988 18022  [177] 18052 18245 18278 18280 18345 18493 18544 18554 18779 18820 19018  [188] 19046 19133 19177 19197 19206 19341 19384 19794 19860 19872  $product\_class  [1] 137 160 367 407 677 781 1004 1131 1197 1283 1654  [12] 1681 1753 1779 2187 2303 2948 2991 3195 3260 3409 3782  [23] 3878 4025 4074 4128 4223 4225 4228 4339 4405 4605 4653  [34] 4714 4833 4896 4967 5065 5159 5207 5261 5267 5603 5862  [45] 6072 6138 6168 6251 6269 6419 6430 6500 6596 6644 6675  [56] 6933 6961 6988 7016 7047 7206 7235 7356 7610 7695 7730  [67] 7735 7780 7851 7949 8160 8216 8298 8322 8329 8424 8486  [78] 8527 8586 8610 8611 8925 8956 9187 9231 9276 9326 9420  [89] 9454 9479 9630 9715 9760 10002 10045 10541 10896 10960 11016  [100] 11116 11219 11393 11518 11531 11549 11834 11843 12022 12072 12139  [111] 12206 12323 12344 12347 12462 12817 12870 12912 12969 13011 13025  [122] 13028 13141 13344 13345 13369 13380 13460 13520 13594 13660 13681  [133] 13720 13739 13809 13849 13873 14228 14305 14410 14423 14444 14608  [144] 14641 14755 14836 14846 14922 15148 15268 15529 15622 15709 15928  [155] 16003 16010 16033 16095 16249 16289 16497 16661 16682 16767 16907  [166] 16935 17150 17236 17292 17332 17432 17535 17768 17919 17988 18022  [177] 18052 18245 18278 18280 18345 18493 18544 18554 18779 18820 19018  [188] 19046 19133 19177 19197 19206 19341 19384 19794 19860 19872  $product\_size  [1] 137 160 367 407 677 781 1004 1131 1197 1283 1654  [12] 1681 1753 1779 2187 2303 2948 2991 3195 3260 3409 3782  [23] 3878 4025 4074 4128 4223 4225 4228 4339 4405 4605 4653  [34] 4714 4833 4896 4967 5065 5159 5207 5261 5267 5603 5862  [45] 6072 6138 6168 6251 6269 6419 6430 6500 6596 6644 6675  [56] 6933 6961 6988 7016 7047 7206 7235 7356 7610 7695 7730  [67] 7735 7780 7851 7949 8160 8216 8298 8322 8329 8424 8486  [78] 8527 8586 8610 8611 8925 8956 9187 9231 9276 9326 9420  [89] 9454 9479 9630 9715 9760 10002 10045 10541 10896 10960 11016  [100] 11116 11219 11393 11518 11531 11549 11834 11843 12022 12072 12139  [111] 12206 12323 12344 12347 12462 12817 12870 12912 12969 13011 13025  [122] 13028 13141 13344 13345 13369 13380 13460 13520 13594 13660 13681  [133] 13720 13739 13809 13849 13873 14228 14305 14410 14423 14444 14608  [144] 14641 14755 14836 14846 14922 15148 15268 15529 15622 15709 15928  [155] 16003 16010 16033 16095 16249 16289 16497 16661 16682 16767 16907  [166] 16935 17150 17236 17292 17332 17432 17535 17768 17919 17988 18022  [177] 18052 18245 18278 18280 18345 18493 18544 18554 18779 18820 19018  [188] 19046 19133 19177 19197 19206 19341 19384 19794 19860 19872  $list\_price  integer(0)  $standard\_cost  [1] 137 160 367 407 677 781 1004 1131 1197 1283 1654  [12] 1681 1753 1779 2187 2303 2948 2991 3195 3260 3409 3782  [23] 3878 4025 4074 4128 4223 4225 4228 4339 4405 4605 4653  [34] 4714 4833 4896 4967 5065 5159 5207 5261 5267 5603 5862  [45] 6072 6138 6168 6251 6269 6419 6430 6500 6596 6644 6675  [56] 6933 6961 6988 7016 7047 7206 7235 7356 7610 7695 7730  [67] 7735 7780 7851 7949 8160 8216 8298 8322 8329 8424 8486  [78] 8527 8586 8610 8611 8925 8956 9187 9231 9276 9326 9420  [89] 9454 9479 9630 9715 9760 10002 10045 10541 10896 10960 11016  [100] 11116 11219 11393 11518 11531 11549 11834 11843 12022 12072 12139  [111] 12206 12323 12344 12347 12462 12817 12870 12912 12969 13011 13025  [122] 13028 13141 13344 13345 13369 13380 13460 13520 13594 13660 13681  [133] 13720 13739 13809 13849 13873 14228 14305 14410 14423 14444 14608  [144] 14641 14755 14836 14846 14922 15148 15268 15529 15622 15709 15928  [155] 16003 16010 16033 16095 16249 16289 16497 16661 16682 16767 16907  [166] 16935 17150 17236 17292 17332 17432 17535 17768 17919 17988 18022  [177] 18052 18245 18278 18280 18345 18493 18544 18554 18779 18820 19018  [188] 19046 19133 19177 19197 19206 19341 19384 19794 19860 19872  $product\_first\_sold\_date  [1] 137 160 367 407 677 781 1004 1131 1197 1283 1654  [12] 1681 1753 1779 2187 2303 2948 2991 3195 3260 3409 3782  [23] 3878 4025 4074 4128 4223 4225 4228 4339 4405 4605 4653  [34] 4714 4833 4896 4967 5065 5159 5207 5261 5267 5603 5862  [45] 6072 6138 6168 6251 6269 6419 6430 6500 6596 6644 6675  [56] 6933 6961 6988 7016 7047 7206 7235 7356 7610 7695 7730  [67] 7735 7780 7851 7949 8160 8216 8298 8322 8329 8424 8486  [78] 8527 8586 8610 8611 8925 8956 9187 9231 9276 9326 9420  [89] 9454 9479 9630 9715 9760 10002 10045 10541 10896 10960 11016  [100] 11116 11219 11393 11518 11531 11549 11834 11843 12022 12072 12139  [111] 12206 12323 12344 12347 12462 12817 12870 12912 12969 13011 13025  [122] 13028 13141 13344 13345 13369 13380 13460 13520 13594 13660 13681  [133] 13720 13739 13809 13849 13873 14228 14305 14410 14423 14444 14608  [144] 14641 14755 14836 14846 14922 15148 15268 15529 15622 15709 15928  [155] 16003 16010 16033 16095 16249 16289 16497 16661 16682 16767 16907  [166] 16935 17150 17236 17292 17332 17432 17535 17768 17919 17988 18022  [177] 18052 18245 18278 18280 18345 18493 18544 18554 18779 18820 19018  [188] 19046 19133 19177 19197 19206 19341 19384 19794 19860 19872 |

NewCustomerList

|  |
| --- |
| $first\_name  integer(0)  $last\_name  [1] 13 59 88 156 203 327 331 358 420 443 456 475 478 485 488 495 503  [18] 532 587 617 756 768 780 787 814 840 850 889 953  $gender  integer(0)  $past\_3\_years\_bike\_related\_purchases  integer(0)  $DOB  [1] 60 227 325 359 361 375 435 440 575 599 665 752 776 836 884 905 985  $job\_title  [1] 16 26 30 31 38 39 40 41 43 45 51 54 75 83 93 95 96  [18] 110 116 126 133 134 150 201 202 208 212 220 223 225 236 266 272 297  [35] 299 308 310 311 318 339 346 352 366 377 387 395 398 406 411 415 421  [52] 458 460 461 488 514 516 518 519 522 527 562 576 612 619 620 622 627  [69] 629 631 639 652 658 663 666 669 690 692 698 704 741 753 760 765 770  [86] 779 801 810 814 833 874 880 882 884 890 900 908 911 915 924 930 953  [103] 954 972 973 990  $job\_industry\_category  integer(0)  $wealth\_segment  integer(0)  $deceased\_indicator  integer(0)  $owns\_car  integer(0)  $tenure  integer(0)  $address  integer(0)  $postcode  integer(0)  $state  integer(0)  $country  integer(0)  $property\_valuation  integer(0)  $...17  integer(0)  $...18  integer(0)  $...19  integer(0)  $...20  integer(0)  $...21  integer(0)  $Rank  integer(0)  $Value  integer(0) |

CustomerDemographic

|  |
| --- |
| $customer\_id  integer(0)  $first\_name  integer(0)  $last\_name  [1] 4 67 106 139 197 211 250 251 257 275 356 460 475  [14] 494 514 526 657 660 676 684 690 703 744 780 790 857  [27] 860 916 927 938 1061 1090 1129 1202 1223 1253 1266 1301 1320  [40] 1351 1376 1453 1455 1469 1512 1584 1611 1651 1691 1712 1727 1746  [53] 1756 1858 1889 1905 1935 1967 2061 2073 2079 2101 2137 2153 2189  [66] 2311 2355 2398 2407 2408 2461 2473 2515 2540 2580 2584 2615 2630  [79] 2716 2835 2894 2907 2912 2918 2919 2943 2945 2989 3038 3052 3053  [92] 3095 3137 3171 3173 3180 3188 3200 3259 3319 3321 3324 3325 3347  [105] 3364 3385 3397 3401 3443 3445 3447 3480 3555 3597 3624 3635 3651  [118] 3718 3756 3817 3885 3916 3927 3962 3999  $gender  integer(0)  $past\_3\_years\_bike\_related\_purchases  integer(0)  $DOB  [1] 144 168 267 290 451 453 454 480 513 526 548 582 599  [14] 680 685 799 839 883 892 950 975 983 996 1038 1044 1082  [27] 1174 1210 1244 1351 1477 1509 1583 1628 1683 1740 1773 1780 1806  [40] 1918 1938 1990 2000 2021 2069 2165 2205 2252 2295 2335 2341 2414  [53] 2426 2469 2540 2642 2647 2696 2697 2854 2920 2963 2999 3012 3086  [66] 3151 3222 3223 3255 3288 3298 3312 3322 3343 3365 3473 3510 3513  [79] 3565 3654 3718 3727 3779 3883 3931 3935 3998  $job\_title  [1] 4 6 7 11 22 23 30 46 52 60 62 74 81  [14] 108 110 161 167 178 185 197 207 217 229 244 262 267  [27] 276 288 296 302 319 336 338 340 344 368 370 379 384  [40] 388 391 398 405 412 418 422 434 442 443 462 464 466  [53] 479 482 497 505 507 510 519 522 535 539 541 548 550  [66] 557 567 577 614 616 622 627 638 659 671 680 683 691  [79] 693 700 703 711 712 714 731 733 738 740 741 745 758  [92] 765 766 771 773 786 787 812 815 820 827 828 860 864  [105] 871 874 879 882 887 895 901 903 908 913 944 953 981  [118] 983 992 1007 1020 1023 1026 1033 1034 1039 1041 1045 1053 1068  [131] 1071 1077 1091 1112 1119 1122 1123 1133 1141 1145 1187 1201 1218  [144] 1219 1230 1233 1239 1246 1249 1255 1264 1268 1272 1289 1292 1294  [157] 1303 1315 1319 1320 1335 1342 1368 1374 1378 1389 1393 1394 1401  [170] 1417 1441 1442 1443 1461 1467 1471 1500 1506 1507 1520 1528 1548  [183] 1549 1559 1560 1578 1599 1604 1605 1613 1614 1615 1639 1643 1647  [196] 1653 1678 1681 1687 1694 1698 1701 1706 1711 1749 1751 1754 1757  [209] 1769 1773 1783 1792 1799 1803 1811 1816 1822 1849 1862 1874 1880  [222] 1883 1884 1892 1899 1925 1948 1966 1971 1972 1977 1986 1994 2022  [235] 2036 2052 2053 2054 2071 2073 2074 2083 2084 2124 2146 2150 2151  [248] 2159 2161 2190 2208 2211 2214 2230 2237 2249 2250 2251 2265 2266  [261] 2271 2281 2300 2304 2342 2407 2409 2424 2426 2439 2441 2446 2455  [274] 2470 2483 2490 2504 2506 2515 2522 2532 2538 2552 2553 2556 2557  [287] 2558 2561 2574 2581 2589 2591 2613 2614 2617 2632 2633 2658 2660  [300] 2677 2685 2703 2709 2710 2721 2722 2734 2737 2750 2756 2757 2758  [313] 2762 2764 2765 2774 2776 2779 2797 2801 2805 2810 2815 2827 2828  [326] 2833 2834 2837 2842 2844 2849 2866 2869 2870 2901 2912 2917 2918  [339] 2921 2935 2941 2946 2947 2949 2965 2972 2986 2995 3006 3008 3009  [352] 3010 3021 3022 3024 3039 3049 3050 3051 3075 3082 3083 3088 3099  [365] 3106 3116 3119 3122 3131 3134 3147 3156 3157 3159 3161 3172 3182  [378] 3186 3190 3207 3213 3226 3227 3231 3236 3250 3261 3264 3267 3274  [391] 3290 3304 3313 3314 3318 3319 3329 3330 3337 3338 3342 3345 3354  [404] 3372 3376 3377 3378 3384 3390 3391 3395 3398 3410 3416 3429 3436  [417] 3447 3456 3457 3459 3476 3479 3480 3498 3499 3500 3505 3516 3523  [430] 3533 3539 3540 3541 3548 3557 3558 3563 3570 3581 3584 3585 3587  [443] 3590 3612 3637 3642 3655 3656 3657 3658 3670 3672 3673 3686 3689  [456] 3693 3694 3705 3713 3716 3720 3722 3724 3733 3744 3749 3754 3756  [469] 3760 3762 3775 3779 3784 3794 3798 3804 3806 3811 3822 3824 3826  [482] 3827 3840 3844 3865 3881 3893 3909 3916 3928 3929 3930 3931 3933  [495] 3935 3939 3945 3946 3952 3959 3960 3968 3972 3979 3987 3999  $job\_industry\_category  integer(0)  $wealth\_segment  integer(0)  $deceased\_indicator  integer(0)  $default  [1] 34 98 119 144 154 168 197 198 267 282 290 297 340  [14] 349 357 441 451 453 454 470 478 480 490 513 526 534  [27] 535 548 582 585 599 615 631 633 650 652 680 683 685  [40] 693 729 740 793 799 805 819 832 839 850 857 868 873  [53] 883 892 950 952 965 975 983 989 996 1000 1001 1015 1024  [66] 1032 1038 1044 1054 1082 1116 1174 1176 1179 1194 1210 1213 1219  [79] 1244 1318 1351 1383 1413 1453 1458 1463 1469 1477 1509 1528 1565  [92] 1583 1602 1609 1626 1628 1683 1740 1751 1768 1773 1780 1781 1806  [105] 1882 1906 1918 1924 1938 1956 1971 1979 1982 1990 1998 2000 2002  [118] 2021 2035 2069 2100 2165 2167 2179 2201 2205 2208 2215 2222 2223  [131] 2226 2252 2265 2274 2295 2335 2341 2411 2414 2426 2459 2469 2480  [144] 2522 2528 2537 2540 2547 2574 2594 2624 2642 2643 2647 2660 2696  [157] 2697 2701 2775 2776 2801 2806 2854 2859 2876 2900 2920 2938 2957  [170] 2963 2999 3006 3012 3022 3033 3034 3042 3053 3086 3108 3131 3150  [183] 3151 3222 3223 3249 3255 3259 3288 3298 3312 3322 3343 3359 3365  [196] 3377 3398 3405 3446 3455 3472 3473 3498 3503 3510 3513 3528 3562  [209] 3565 3580 3588 3595 3627 3633 3654 3658 3696 3718 3724 3727 3752  [222] 3764 3779 3791 3825 3840 3843 3859 3863 3874 3883 3890 3922 3925  [235] 3931 3935 3964 3971 3986 3998  $owns\_car  integer(0)  $tenure  [1] 144 168 267 290 451 453 454 480 513 526 548 582 599  [14] 680 685 799 839 883 892 950 975 983 996 1038 1044 1082  [27] 1174 1210 1244 1351 1477 1509 1583 1628 1683 1740 1773 1780 1806  [40] 1918 1938 1990 2000 2021 2069 2165 2205 2252 2295 2335 2341 2414  [53] 2426 2469 2540 2642 2647 2696 2697 2854 2920 2963 2999 3012 3086  [66] 3151 3222 3223 3255 3288 3298 3312 3322 3343 3365 3473 3510 3513  [79] 3565 3654 3718 3727 3779 3883 3931 3935 3998 |

CustomerAddress

|  |
| --- |
| $customer\_id  integer(0)  $address  integer(0)  $postcode  integer(0)  $state  integer(0)  $country  integer(0)  $property\_valuation  integer(0) |

Uniqueness

**Transaction dataset has total 101unique product \_id entries**