

Scrum_6_7

```
library(magrittr)
library(dataQualityR)
```

```
bank = read.csv("C:\\Users\\Jordan Williams\\Downloads\\BankLoan Dataset 2020.csv")
```

```
checkDataQuality(bank,out.file.num = "first.csv",out.file.cat = "second.csv")
```

```
## Check for numeric variables completed // Results saved to disk // Time difference of 0.041888 secs
## Check for categorical variables completed // Results saved to disk // Time difference of 0.01399302 s
```

```
summary(bank)
```

```
##      RefNum      agerange      age      job
## Min.   :10023467      : 2   Min.   :22.00   blue-collar:348
## 1st Qu.:10023748   18-30 : 97   1st Qu.:35.00   technician :167
## Median :10024028   31-40 :430   Median :42.00   admin.     :153
## Mean   :10024028   41-60 :594   Mean   :42.46   management :148
## 3rd Qu.:10024308   over 60: 2   3rd Qu.:50.00   services   :145
## Max.   :10024589           Max.   :61.00   retired    : 49
## NA's   :2           NA's   :2   (Other)    :115
##      marital      education      balance      housing      loan
##      : 2           :100   Min.   : -932.0      : 2           : 2
## divorced:165   primary :198   1st Qu.: 23.0   no :129   no :624
## married :709   secondary:626   Median : 167.0   yes:994   yes:499
## single  :249   tertiary :201   Mean    : 567.3
##                                     3rd Qu.: 446.0
##                                     Max.    :58544.0
##                                     NA's    :2
##      month      date      duration      deposit
## april   : 94   1/1/2018: 94   Min.    : 2.0   Min.    : 0.00
## february: 94   2/1/2018: 94   1st Qu.: 130.0   1st Qu.: 12.25
## january : 94   3/1/2018: 94   Median : 203.0   Median : 52.00
## july    : 94   4/1/2018: 94   Mean    : 270.5   Mean    : 93.71
## june    : 94   5/1/2018: 94   3rd Qu.: 315.5   3rd Qu.: 111.20
## march   : 94   6/1/2018: 94   Max.    :2177.0   Max.    :2458.72
## (Other) :561   (Other) :561   NA's    :2   NA's    :196
##      lead      product      qualified      contacted
## Min.   :0.0000      : 2   Min.   :0.0000   Min.   :0.0000
## 1st Qu.:0.0000   auto   :217   1st Qu.:0.0000   1st Qu.:0.0000
## Median :1.0000   business : 25   Median :1.0000   Median :1.0000
## Mean    :0.6883   mortgage :312   Mean    :0.6073   Mean    :0.6081
## 3rd Qu.:1.0000   no product:350   3rd Qu.:1.0000   3rd Qu.:1.0000
## Max.    :1.0000   unsecured :219   Max.    :1.0000   Max.    :1.0000
## NA's    :2           NA's    :2   NA's    :232
##      won      loanvalue      NPS
## Min.   :0.0000   Min.    : 1526   Min.    : 3.000
```

```
## 1st Qu.:0.0000 1st Qu.: 2586 1st Qu.: 8.000
## Median :0.0000 Median : 6530 Median : 9.000
## Mean :0.4426 Mean : 5881 Mean : 8.974
## 3rd Qu.:1.0000 3rd Qu.: 7854 3rd Qu.:10.000
## Max. :1.0000 Max. :12353 Max. :10.000
## NA's :2 NA's :191 NA's :628
```

```
bank[is.na(bank$age),]
```

```
## RefNum agerange age job marital education balance housing loan month date
## 1124 NA NA NA NA NA NA NA NA NA NA
## 1125 NA NA NA NA NA NA NA NA NA NA
## duration deposit lead product qualified contacted won loanvalue NPS
## 1124 NA NA NA NA NA NA NA NA NA NA
## 1125 NA NA NA NA NA NA NA NA NA NA
```

```
bank = bank[!is.na(bank$age),]
```

```
summary(bank$job)
```

```
## admin. blue-collar entrepreneur housemaid
## 5 153 348 33 11
## management retired self-employed services student
## 148 49 27 145 14
## technician unemployed
## 167 23
```

```
levels(bank$job)
```

```
## [1] "" "admin." "blue-collar" "entrepreneur"
## [5] "housemaid" "management" "retired" "self-employed"
## [9] "services" "student" "technician" "unemployed"
```

```
bank$job = as.character(bank$job)
```

```
bank = bank[!bank$job == "",]
```

```
bank$job = as.factor(bank$job)
```

```
bank$marital = bank$marital %>% as.character() %>% as.factor()
```

```
bank$education = bank$education %>% as.character()
```

```
bank = bank[!bank$education == "",]
```

```
bank$education = bank$education %>% as.factor()
```

```
bank$date = as.Date(bank$date,"%m/%d/%Y")
```

```
bank[is.na(bank$deposit),]
```

```
## RefNum agerange age job marital education balance housing
## 25 10023491 31-40 40 retired married primary 0 yes
## 26 10023492 41-60 44 admin. married secondary -372 yes
## 28 10023494 41-60 52 entrepreneur married secondary 113 yes
## 29 10023495 41-60 46 management single secondary -246 yes
## 36 10023502 41-60 57 technician divorced secondary 63 yes
## 37 10023503 18-30 25 blue-collar married secondary -7 yes
## 38 10023504 41-60 53 technician married secondary -3 no
```

## 46	10023512	31-40	36	admin.	single	primary	-171	yes
## 47	10023513	41-60	58	self-employed	married	tertiary	-364	yes
## 51	10023517	41-60	54	blue-collar	married	secondary	1291	yes
## 52	10023518	41-60	48	management	divorced	tertiary	-244	yes
## 53	10023519	31-40	32	management	married	tertiary	0	yes
## 54	10023520	41-60	42	admin.	single	secondary	-76	yes
## 55	10023521	18-30	24	technician	single	secondary	-103	yes
## 95	10023561	41-60	57	entrepreneur	divorced	secondary	-37	no
## 100	10023566	41-60	46	management	married	tertiary	229	yes
## 101	10023567	41-60	44	blue-collar	married	secondary	-674	yes
## 112	10023578	41-60	46	technician	divorced	secondary	79	no
## 113	10023579	41-60	56	self-employed	married	primary	-34	yes
## 117	10023583	41-60	41	admin.	married	secondary	351	yes
## 118	10023584	31-40	33	management	single	tertiary	-67	yes
## 127	10023593	18-30	29	admin.	single	secondary	818	yes
## 128	10023594	31-40	34	services	married	secondary	-16	yes
## 150	10023616	41-60	54	blue-collar	married	primary	348	yes
## 152	10023618	18-30	26	student	single	secondary	0	yes
## 153	10023619	31-40	40	management	married	tertiary	-4	yes
## 210	10023676	41-60	42	retired	married	secondary	56	yes
## 211	10023677	31-40	38	blue-collar	married	secondary	-390	yes
## 214	10023680	31-40	36	services	married	secondary	301	yes
## 215	10023681	41-60	54	blue-collar	married	primary	-41	yes
## 222	10023688	18-30	28	blue-collar	married	primary	324	yes
## 223	10023689	31-40	35	entrepreneur	divorced	secondary	-69	yes
## 230	10023696	41-60	53	services	divorced	secondary	1467	yes
## 231	10023697	41-60	47	blue-collar	married	primary	-12	yes
## 239	10023705	41-60	44	admin.	divorced	secondary	66	yes
## 240	10023706	41-60	49	blue-collar	divorced	primary	-9	yes
## 267	10023733	31-40	37	management	single	tertiary	600	yes
## 268	10023734	31-40	39	admin.	divorced	secondary	-349	yes
## 276	10023742	41-60	59	retired	married	secondary	319	yes
## 277	10023743	31-40	39	services	divorced	secondary	-185	yes
## 281	10023747	41-60	50	blue-collar	married	primary	61	yes
## 282	10023748	41-60	41	admin.	married	secondary	-62	yes
## 315	10023781	31-40	33	admin.	single	tertiary	193	no
## 316	10023782	41-60	46	admin.	married	secondary	-358	yes
## 333	10023799	18-30	30	blue-collar	single	secondary	-457	yes
## 338	10023804	41-60	53	technician	married	secondary	56	yes
## 339	10023805	41-60	51	admin.	single	secondary	-2	no
## 342	10023808	41-60	43	management	divorced	secondary	693	yes
## 343	10023809	31-40	40	blue-collar	divorced	secondary	-333	yes
## 347	10023813	41-60	45	technician	married	secondary	44	yes
## 348	10023814	31-40	39	blue-collar	married	primary	-100	yes
## 412	10023878	41-60	51	blue-collar	married	primary	230	yes
## 413	10023879	31-40	39	admin.	single	secondary	-25	yes
## 456	10023922	41-60	44	blue-collar	married	secondary	274	yes
## 457	10023923	31-40	40	admin.	single	secondary	-109	yes
## 458	10023924	31-40	37	technician	married	secondary	1	yes
## 459	10023925	31-40	33	blue-collar	single	secondary	-60	no
## 460	10023926	31-40	35	blue-collar	married	secondary	89	yes
## 461	10023927	41-60	58	blue-collar	divorced	secondary	-11	no
## 462	10023928	31-40	39	blue-collar	married	primary	0	yes
## 463	10023929	41-60	43	blue-collar	married	secondary	-509	yes

## 487	10023953	41-60	43	blue-collar	divorced	secondary	110	yes
## 488	10023954	41-60	59	management	divorced	tertiary	-76	yes
## 490	10023956	31-40	40	blue-collar	married	primary	-66	yes
## 494	10023960	41-60	55	unemployed	married	tertiary	5345	no
## 495	10023961	18-30	30	blue-collar	divorced	secondary	-209	yes
## 498	10023964	41-60	50	blue-collar	divorced	secondary	41	yes
## 499	10023965	41-60	44	blue-collar	married	secondary	-99	yes
## 501	10023967	41-60	46	admin.	married	primary	276	yes
## 506	10023972	41-60	45	blue-collar	married	primary	1297	yes
## 507	10023973	41-60	57	retired	divorced	secondary	-331	yes
## 537	10024003	41-60	48	blue-collar	married	secondary	157	yes
## 538	10024004	41-60	45	blue-collar	married	primary	-66	yes
## 540	10024006	31-40	34	blue-collar	married	primary	-144	yes
## 555	10024021	31-40	33	blue-collar	married	secondary	-10	yes
## 556	10024022	31-40	36	admin.	married	secondary	-106	yes
## 568	10024034	41-60	46	unemployed	married	secondary	-125	yes
## 572	10024038	41-60	56	blue-collar	married	secondary	1602	yes
## 573	10024039	41-60	41	blue-collar	single	primary	-137	yes
## 589	10024055	18-30	30	technician	single	secondary	0	yes
## 590	10024056	31-40	37	blue-collar	married	primary	-325	yes
## 591	10024057	31-40	36	technician	single	secondary	-15	yes
## 602	10024068	31-40	37	blue-collar	married	secondary	395	yes
## 619	10024085	31-40	40	blue-collar	married	primary	2880	yes
## 623	10024089	31-40	40	technician	married	secondary	109	yes
## 624	10024090	41-60	59	retired	married	primary	-119	yes
## 634	10024100	31-40	33	services	married	tertiary	85	no
## 635	10024101	41-60	52	entrepreneur	married	tertiary	-184	yes
## 636	10024102	41-60	52	services	married	secondary	660	no
## 637	10024103	41-60	52	blue-collar	divorced	primary	-183	yes
## 649	10024115	41-60	41	management	married	tertiary	65	yes
## 650	10024116	41-60	41	technician	married	secondary	-366	yes
## 655	10024121	18-30	28	technician	single	secondary	312	yes
## 656	10024122	31-40	33	blue-collar	married	secondary	-349	yes
## 658	10024124	31-40	40	blue-collar	married	primary	-322	yes
## 659	10024125	18-30	29	admin.	married	secondary	-150	yes
## 674	10024140	18-30	29	blue-collar	married	secondary	43	yes
## 675	10024141	31-40	31	management	single	tertiary	-173	yes
## 677	10024143	31-40	37	blue-collar	married	primary	215	yes
## 678	10024144	31-40	35	technician	married	secondary	-131	yes
## 698	10024164	41-60	49	blue-collar	married	secondary	26	yes
## 704	10024170	41-60	43	services	divorced	secondary	0	yes
## 705	10024171	41-60	43	admin.	single	secondary	-497	yes
## 736	10024202	31-40	35	blue-collar	single	secondary	376	yes
## 737	10024203	31-40	40	blue-collar	married	primary	-7	yes
## 759	10024225	41-60	59	services	married	secondary	307	yes
## 760	10024226	31-40	37	technician	married	secondary	-421	yes
## 778	10024244	41-60	45	management	married	tertiary	103	yes
## 779	10024245	41-60	43	blue-collar	married	primary	-454	yes
## 782	10024248	41-60	47	blue-collar	married	secondary	1001	yes
## 783	10024249	41-60	51	services	divorced	secondary	-69	yes
## 810	10024276	41-60	57	technician	married	secondary	197	no
## 811	10024277	31-40	36	blue-collar	married	secondary	-251	yes
## 812	10024278	41-60	45	self-employed	divorced	secondary	-139	yes
## 825	10024291	31-40	34	services	married	secondary	302	yes

##	826	10024292	31-40	36	services	divorced	secondary	-290	yes
##	835	10024301	31-40	35	technician	single	secondary	539	yes
##	836	10024302	41-60	44	technician	divorced	secondary	-329	yes
##	837	10024303	18-30	30	services	single	secondary	-174	yes
##	838	10024304	41-60	45	entrepreneur	married	secondary	68	yes
##	844	10024310	31-40	39	blue-collar	married	secondary	72	yes
##	845	10024311	31-40	37	services	single	secondary	-196	yes
##	847	10024313	31-40	37	management	married	tertiary	0	yes
##	848	10024314	41-60	42	services	married	secondary	-246	yes
##	849	10024315	41-60	56	blue-collar	married	secondary	-203	yes
##	852	10024318	18-30	29	technician	single	tertiary	3	yes
##	853	10024319	41-60	54	management	married	tertiary	-248	yes
##	891	10024357	18-30	29	student	single	secondary	872	yes
##	892	10024358	41-60	53	services	divorced	primary	-291	yes
##	924	10024390	18-30	30	services	single	tertiary	542	yes
##	925	10024391	31-40	32	blue-collar	married	secondary	-205	yes
##	928	10024394	41-60	55	blue-collar	married	secondary	1268	yes
##	929	10024395	41-60	52	blue-collar	married	secondary	-98	yes
##	930	10024396	31-40	33	admin.	married	secondary	44	yes
##	931	10024397	41-60	55	retired	married	primary	-90	yes
##	932	10024398	31-40	33	blue-collar	married	secondary	0	no
##	933	10024399	31-40	40	blue-collar	married	secondary	-94	yes
##	934	10024400	31-40	39	blue-collar	married	secondary	-345	yes
##	935	10024401	41-60	54	blue-collar	married	secondary	-932	yes
##	941	10024407	31-40	40	blue-collar	married	secondary	61	yes
##	942	10024408	41-60	47	blue-collar	married	secondary	-5	yes
##	943	10024409	31-40	31	services	single	secondary	-45	no
##	945	10024411	31-40	31	services	married	secondary	564	yes
##	946	10024412	31-40	33	admin.	married	secondary	-6	yes
##	958	10024424	41-60	57	retired	married	secondary	502	yes
##	959	10024425	31-40	38	services	married	secondary	-32	yes
##	974	10024440	41-60	58	retired	married	secondary	268	yes
##	975	10024441	31-40	31	unemployed	married	secondary	-825	yes
##	992	10024458	31-40	33	management	married	tertiary	436	yes
##	993	10024459	31-40	38	blue-collar	single	secondary	-1	yes
##	1003	10024469	18-30	30	blue-collar	single	primary	660	yes
##	1004	10024470	41-60	44	services	married	primary	-79	yes
##	1006	10024472	18-30	30	services	single	secondary	342	yes
##	1021	10024487	31-40	36	entrepreneur	married	tertiary	1722	yes
##	1022	10024488	41-60	48	technician	married	secondary	-500	yes
##	1049	10024515	41-60	51	management	married	primary	98	yes
##	1050	10024516	41-60	52	technician	single	secondary	-181	yes
##	1051	10024517	41-60	45	technician	married	secondary	118	yes
##	1052	10024518	41-60	41	blue-collar	married	secondary	-15	yes
##	1054	10024520	41-60	50	blue-collar	married	secondary	1557	yes
##	1055	10024521	31-40	36	blue-collar	married	primary	-20	yes
##	1056	10024522	41-60	46	blue-collar	married	primary	323	yes
##	1057	10024523	41-60	44	blue-collar	married	primary	-171	yes
##	1062	10024528	41-60	58	technician	married	secondary	786	yes
##	1063	10024529	18-30	30	technician	divorced	tertiary	-317	yes
##	1064	10024530	41-60	43	blue-collar	married	secondary	667	yes
##	1065	10024531	18-30	29	services	single	secondary	-158	yes
##	1078	10024544	18-30	27	blue-collar	single	secondary	0	yes
##	1079	10024545	41-60	56	management	married	primary	-24	yes

##	1090	10024556	31-40	37	blue-collar	married	primary	321	yes
##	1091	10024557	31-40	39	blue-collar	married	tertiary	-33	yes
##	1102	10024568	31-40	38	blue-collar	married	primary	1807	no
##	1103	10024569	41-60	44	blue-collar	single	secondary	-212	yes
##	1108	10024574	41-60	43	blue-collar	married	primary	487	yes
##	1109	10024575	41-60	52	blue-collar	divorced	primary	-57	yes
##	1110	10024576	31-40	32	services	single	secondary	81	yes
##	1111	10024577	31-40	40	admin.	single	secondary	-227	yes
##		loan	month	date	duration	deposit	lead	product	qualified
##	25	no	january	2018-01-01	181	NA	0	no product	0
##	26	yes	february	2018-02-01	172	NA	0	no product	0
##	28	yes	april	2018-04-01	127	NA	0	no product	0
##	29	no	may	2018-05-01	255	NA	0	no product	0
##	36	no	december	2018-12-01	242	NA	1	mortgage	1
##	37	no	january	2018-01-01	365	NA	1	mortgage	1
##	38	yes	february	2018-02-01	1666	NA	1	mortgage	1
##	46	no	october	2018-10-01	242	NA	1	unsecured	0
##	47	yes	november	2018-11-01	355	NA	1	unsecured	0
##	51	yes	march	2018-03-01	266	NA	1	unsecured	0
##	52	yes	april	2018-04-01	253	NA	1	auto	1
##	53	yes	may	2018-05-01	179	NA	1	auto	1
##	54	no	june	2018-06-01	787	NA	1	auto	1
##	55	no	july	2018-07-01	145	NA	1	auto	1
##	95	no	november	2018-11-01	173	NA	0	no product	0
##	100	yes	april	2018-04-01	197	NA	1	mortgage	1
##	101	yes	may	2018-05-01	257	NA	1	mortgage	0
##	112	no	april	2018-04-01	144	NA	1	auto	1
##	113	yes	may	2018-05-01	212	NA	0	no product	0
##	117	yes	september	2018-09-01	518	NA	1	auto	1
##	118	no	october	2018-10-01	364	NA	1	auto	1
##	127	no	july	2018-07-01	61	NA	1	business	0
##	128	no	august	2018-08-01	78	NA	1	business	0
##	150	yes	june	2018-06-01	579	NA	1	mortgage	1
##	152	no	august	2018-08-01	610	NA	1	mortgage	1
##	153	yes	september	2018-09-01	2033	NA	1	mortgage	1
##	210	yes	june	2018-06-01	215	NA	1	auto	1
##	211	no	july	2018-07-01	287	NA	1	auto	1
##	214	no	october	2018-10-01	210	NA	1	auto	1
##	215	yes	november	2018-11-01	288	NA	1	auto	1
##	222	no	june	2018-06-01	175	NA	1	unsecured	1
##	223	no	july	2018-07-01	300	NA	1	mortgage	1
##	230	no	february	2018-02-01	124	NA	1	mortgage	1
##	231	yes	march	2018-03-01	18	NA	1	mortgage	1
##	239	no	november	2018-11-01	206	NA	1	unsecured	1
##	240	no	december	2018-12-01	389	NA	1	unsecured	1
##	267	no	march	2018-03-01	152	NA	1	auto	1
##	268	no	april	2018-04-01	611	NA	1	auto	1
##	276	yes	december	2018-12-01	143	NA	1	auto	1
##	277	no	january	2018-01-01	189	NA	1	auto	1
##	281	yes	may	2018-05-01	621	NA	1	mortgage	1
##	282	yes	june	2018-06-01	55	NA	1	mortgage	1
##	315	no	march	2018-03-01	132	NA	1	auto	1
##	316	yes	april	2018-04-01	358	NA	1	auto	1
##	333	no	september	2018-09-01	143	NA	1	mortgage	1

## 338	yes	february	2018-02-01	152	NA	1	mortgage	1
## 339	no	march	2018-03-01	402	NA	1	mortgage	1
## 342	no	june	2018-06-01	124	NA	1	mortgage	1
## 343	no	july	2018-07-01	183	NA	1	mortgage	1
## 347	yes	november	2018-11-01	95	NA	1	mortgage	1
## 348	no	december	2018-12-01	680	NA	1	unsecured	1
## 412	yes	april	2018-04-01	673	NA	0	no product	0
## 413	no	may	2018-05-01	576	NA	0	no product	0
## 456	yes	december	2018-12-01	409	NA	0	no product	0
## 457	no	january	2018-01-01	170	NA	0	no product	0
## 458	no	february	2018-02-01	608	NA	0	no product	0
## 459	no	march	2018-03-01	243	NA	0	no product	0
## 460	no	april	2018-04-01	145	NA	0	no product	0
## 461	no	may	2018-05-01	112	NA	0	no product	0
## 462	no	june	2018-06-01	262	NA	0	no product	0
## 463	yes	july	2018-07-01	124	NA	0	no product	0
## 487	no	july	2018-07-01	448	NA	0	no product	0
## 488	yes	august	2018-08-01	264	NA	0	no product	0
## 490	no	october	2018-10-01	288	NA	0	no product	0
## 494	yes	february	2018-02-01	278	NA	0	no product	0
## 495	no	march	2018-03-01	188	NA	0	no product	0
## 498	no	june	2018-06-01	190	NA	0	no product	0
## 499	yes	july	2018-07-01	111	NA	0	no product	0
## 501	yes	september	2018-09-01	157	NA	0	no product	0
## 506	yes	february	2018-02-01	233	NA	0	no product	0
## 507	no	march	2018-03-01	531	NA	0	no product	0
## 537	yes	september	2018-09-01	73	NA	0	no product	0
## 538	yes	october	2018-10-01	263	NA	0	no product	0
## 540	no	december	2018-12-01	79	NA	1	mortgage	1
## 555	no	march	2018-03-01	123	NA	1	unsecured	1
## 556	no	april	2018-04-01	130	NA	1	unsecured	1
## 568	yes	april	2018-04-01	23	NA	1	mortgage	1
## 572	yes	august	2018-08-01	427	NA	1	mortgage	1
## 573	no	september	2018-09-01	189	NA	1	mortgage	1
## 589	no	january	2018-01-01	369	NA	1	mortgage	1
## 590	no	february	2018-02-01	112	NA	1	mortgage	1
## 591	no	march	2018-03-01	341	NA	1	mortgage	1
## 602	no	february	2018-02-01	219	NA	1	mortgage	1
## 619	no	july	2018-07-01	145	NA	1	unsecured	0
## 623	no	november	2018-11-01	147	NA	1	unsecured	0
## 624	yes	december	2018-12-01	289	NA	1	unsecured	0
## 634	yes	october	2018-10-01	262	NA	1	auto	1
## 635	yes	november	2018-11-01	392	NA	1	auto	1
## 636	yes	december	2018-12-01	201	NA	1	auto	1
## 637	no	january	2018-01-01	145	NA	1	auto	1
## 649	yes	january	2018-01-01	524	NA	1	mortgage	1
## 650	yes	february	2018-02-01	29	NA	1	mortgage	1
## 655	no	july	2018-07-01	392	NA	1	mortgage	1
## 656	no	august	2018-08-01	191	NA	1	mortgage	1
## 658	no	october	2018-10-01	144	NA	1	unsecured	1
## 659	no	november	2018-11-01	328	NA	1	unsecured	1
## 674	no	february	2018-02-01	268	NA	1	mortgage	1
## 675	no	march	2018-03-01	396	NA	1	mortgage	1
## 677	no	may	2018-05-01	308	NA	1	mortgage	1

## 678	no	june	2018-06-01	467	NA	1	auto	1
## 698	yes	february	2018-02-01	276	NA	0	no product	0
## 704	no	august	2018-08-01	125	NA	0	no product	0
## 705	no	september	2018-09-01	234	NA	0	no product	0
## 736	no	april	2018-04-01	207	NA	1	unsecured	1
## 737	no	may	2018-05-01	410	NA	1	unsecured	1
## 759	yes	march	2018-03-01	250	NA	1	auto	1
## 760	no	april	2018-04-01	183	NA	1	unsecured	1
## 778	yes	october	2018-10-01	35	NA	0	no product	0
## 779	yes	november	2018-11-01	322	NA	0	no product	0
## 782	yes	february	2018-02-01	201	NA	0	no product	0
## 783	no	march	2018-03-01	216	NA	0	no product	0
## 810	yes	june	2018-06-01	32	NA	1	mortgage	1
## 811	no	july	2018-07-01	162	NA	1	mortgage	1
## 812	no	august	2018-08-01	152	NA	1	mortgage	1
## 825	no	september	2018-09-01	124	NA	1	auto	1
## 826	no	october	2018-10-01	128	NA	1	auto	1
## 835	no	july	2018-07-01	520	NA	1	mortgage	1
## 836	no	august	2018-08-01	171	NA	1	mortgage	1
## 837	no	september	2018-09-01	113	NA	1	mortgage	1
## 838	yes	october	2018-10-01	254	NA	1	mortgage	1
## 844	no	april	2018-04-01	425	NA	1	mortgage	1
## 845	no	may	2018-05-01	207	NA	1	mortgage	1
## 847	yes	july	2018-07-01	228	NA	1	mortgage	1
## 848	yes	august	2018-08-01	149	NA	1	mortgage	1
## 849	yes	september	2018-09-01	139	NA	1	mortgage	1
## 852	no	december	2018-12-01	359	NA	1	mortgage	1
## 853	yes	january	2018-01-01	112	NA	1	mortgage	1
## 891	no	march	2018-03-01	230	NA	1	mortgage	1
## 892	no	april	2018-04-01	591	NA	1	mortgage	1
## 924	no	december	2018-12-01	435	NA	1	auto	0
## 925	no	january	2018-01-01	388	NA	1	auto	0
## 928	yes	april	2018-04-01	223	NA	1	auto	0
## 929	yes	may	2018-05-01	423	NA	1	business	1
## 930	no	june	2018-06-01	231	NA	1	auto	1
## 931	yes	july	2018-07-01	634	NA	1	auto	1
## 932	no	august	2018-08-01	107	NA	1	auto	1
## 933	no	september	2018-09-01	227	NA	0	no product	0
## 934	no	october	2018-10-01	69	NA	0	no product	0
## 935	yes	november	2018-11-01	799	NA	0	no product	0
## 941	no	may	2018-05-01	112	NA	0	no product	0
## 942	yes	june	2018-06-01	444	NA	0	no product	0
## 943	no	july	2018-07-01	246	NA	0	no product	0
## 945	no	september	2018-09-01	223	NA	1	business	0
## 946	no	october	2018-10-01	566	NA	1	business	0
## 958	yes	october	2018-10-01	229	NA	0	no product	0
## 959	no	november	2018-11-01	154	NA	0	no product	0
## 974	yes	february	2018-02-01	516	NA	1	auto	1
## 975	no	march	2018-03-01	179	NA	1	auto	1
## 992	yes	august	2018-08-01	48	NA	0	no product	0
## 993	no	september	2018-09-01	72	NA	0	no product	0
## 1003	no	july	2018-07-01	912	NA	1	unsecured	1
## 1004	yes	august	2018-08-01	179	NA	0	no product	0
## 1006	no	october	2018-10-01	206	NA	0	no product	0

##	1021	yes	january	2018-01-01	349	NA	1	business	1
##	1022	yes	february	2018-02-01	78	NA	1	business	1
##	1049	yes	may	2018-05-01	114	NA	1	unsecured	1
##	1050	no	june	2018-06-01	94	NA	1	unsecured	1
##	1051	yes	july	2018-07-01	208	NA	1	mortgage	1
##	1052	yes	august	2018-08-01	169	NA	1	mortgage	1
##	1054	yes	october	2018-10-01	263	NA	1	mortgage	1
##	1055	no	november	2018-11-01	353	NA	1	mortgage	1
##	1056	yes	december	2018-12-01	108	NA	1	mortgage	1
##	1057	yes	january	2018-01-01	441	NA	1	mortgage	1
##	1062	yes	june	2018-06-01	165	NA	1	mortgage	1
##	1063	no	july	2018-07-01	381	NA	1	mortgage	1
##	1064	yes	august	2018-08-01	228	NA	1	mortgage	1
##	1065	no	september	2018-09-01	128	NA	1	auto	1
##	1078	no	october	2018-10-01	191	NA	0	no product	0
##	1079	yes	november	2018-11-01	305	NA	0	no product	0
##	1090	no	october	2018-10-01	228	NA	0	no product	0
##	1091	yes	november	2018-11-01	62	NA	0	no product	0
##	1102	no	october	2018-10-01	348	NA	0	no product	0
##	1103	no	november	2018-11-01	103	NA	0	no product	0
##	1108	yes	april	2018-04-01	548	NA	0	no product	0
##	1109	no	may	2018-05-01	114	NA	0	no product	0
##	1110	no	june	2018-06-01	126	NA	0	no product	0
##	1111	no	july	2018-07-01	161	NA	0	no product	0
##		contacted	won	loanvalue	NPS				
##	25	0	0	NA	NA				
##	26	0	0	NA	NA				
##	28	0	0	NA	NA				
##	29	0	0	NA	NA				
##	36	1	0	2356	NA				
##	37	1	0	7654	NA				
##	38	1	0	7854	NA				
##	46	1	0	6530	NA				
##	47	1	0	2476	NA				
##	51	1	0	5699	NA				
##	52	1	0	3237	NA				
##	53	1	0	2558	NA				
##	54	1	0	2298	NA				
##	55	1	0	3397	NA				
##	95	0	0	NA	NA				
##	100	1	0	4376	NA				
##	101	1	0	6895	NA				
##	112	NA	0	8675	NA				
##	113	0	0	9764	NA				
##	117	NA	0	7543	NA				
##	118	NA	0	4080	NA				
##	127	NA	0	7632	NA				
##	128	NA	0	9753	NA				
##	150	NA	0	3237	NA				
##	152	NA	0	6895	NA				
##	153	NA	0	7632	NA				
##	210	1	1	2106	10				
##	211	1	1	4384	10				
##	214	1	1	5699	10				

## 215	1	1	3237	10
## 222	1	1	4384	10
## 223	1	1	4080	10
## 230	1	1	2106	10
## 231	1	1	6895	10
## 239	1	1	8954	10
## 240	1	1	3678	10
## 267	1	1	8675	10
## 268	1	1	9764	10
## 276	1	1	5699	10
## 277	1	1	3237	10
## 281	1	1	2106	10
## 282	1	1	6895	10
## 315	NA	0	7543	NA
## 316	NA	0	4384	NA
## 333	1	1	2476	10
## 338	1	1	3237	10
## 339	1	1	2558	10
## 342	1	1	2106	10
## 343	1	1	6895	10
## 347	1	1	12353	10
## 348	1	1	2356	10
## 412	0	0	3678	NA
## 413	0	0	4853	NA
## 456	0	0	NA	NA
## 457	0	0	NA	NA
## 458	0	0	NA	NA
## 459	0	0	NA	NA
## 460	0	0	NA	NA
## 461	0	0	NA	NA
## 462	0	0	NA	NA
## 463	0	0	NA	NA
## 487	0	0	NA	NA
## 488	0	0	NA	NA
## 490	0	0	NA	NA
## 494	0	0	NA	NA
## 495	0	0	NA	NA
## 498	0	0	NA	NA
## 499	0	0	NA	NA
## 501	0	0	NA	NA
## 506	0	0	NA	NA
## 507	0	0	NA	NA
## 537	0	0	NA	NA
## 538	0	0	NA	NA
## 540	1	1	8675	10
## 555	1	1	6895	9
## 556	1	1	7632	9
## 568	1	1	6895	9
## 572	1	1	12353	9
## 573	1	1	2356	9
## 589	1	1	2457	9
## 590	1	1	3678	9
## 591	1	1	9765	9
## 602	1	1	2457	9

## 619	NA	0	9764	NA
## 623	NA	0	6895	NA
## 624	NA	0	7632	NA
## 634	1	1	7654	9
## 635	1	1	7854	9
## 636	1	1	6895	9
## 637	1	1	7632	9
## 649	1	1	2457	9
## 650	1	1	3678	9
## 655	1	1	9753	9
## 656	1	1	6895	9
## 658	1	1	9753	8
## 659	1	1	3421	8
## 674	NA	0	8675	NA
## 675	NA	0	9764	NA
## 677	NA	0	3678	NA
## 678	NA	0	9765	NA
## 698	0	0	7632	NA
## 704	0	0	9753	NA
## 705	0	0	2257	NA
## 736	1	1	2106	8
## 737	1	1	3521	8
## 759	1	1	2457	8
## 760	1	1	3678	8
## 778	0	0	3678	NA
## 779	0	0	9765	NA
## 782	0	0	9753	NA
## 783	0	0	2257	NA
## 810	1	1	6895	8
## 811	1	1	7632	8
## 812	1	1	9753	8
## 825	1	1	6895	6
## 826	1	1	7632	6
## 835	1	1	8675	6
## 836	1	1	9764	6
## 837	1	1	2457	6
## 838	1	1	3678	6
## 844	1	1	12353	6
## 845	1	1	6895	6
## 847	1	1	9753	3
## 848	1	1	2257	3
## 849	1	1	12353	3
## 852	1	1	7854	3
## 853	1	1	6895	3
## 891	1	1	3678	10
## 892	1	1	9765	10
## 924	NA	0	6895	NA
## 925	NA	0	7632	NA
## 928	NA	0	12353	NA
## 929	NA	0	2356	NA
## 930	NA	0	7654	NA
## 931	NA	0	7854	NA
## 932	NA	0	8954	NA
## 933	0	0	3678	NA

## 934	0	0	4853	NA
## 935	0	0	8675	NA
## 941	0	0	6895	NA
## 942	0	0	7632	NA
## 943	0	0	9753	NA
## 945	NA	0	7632	NA
## 946	NA	0	9753	NA
## 958	0	0	NA	NA
## 959	0	0	NA	NA
## 974	NA	0	2586	NA
## 975	NA	0	6530	NA
## 992	0	0	NA	NA
## 993	0	0	NA	NA
## 1003	1	1	5699	9
## 1004	0	0	3237	NA
## 1006	0	0	2298	NA
## 1021	1	1	3251	9
## 1022	1	1	4324	9
## 1049	1	1	6895	9
## 1050	1	1	7632	9
## 1051	1	1	6895	9
## 1052	1	1	7632	9
## 1054	1	1	8675	9
## 1055	1	1	9764	9
## 1056	1	1	2457	9
## 1057	1	1	3678	9
## 1062	NA	0	2257	NA
## 1063	NA	0	12353	NA
## 1064	NA	0	6895	NA
## 1065	NA	0	7632	NA
## 1078	0	0	7654	NA
## 1079	0	0	7854	NA
## 1090	0	0	7632	NA
## 1091	0	0	9753	NA
## 1102	0	0	NA	NA
## 1103	0	0	NA	NA
## 1108	0	0	NA	NA
## 1109	0	0	NA	NA
## 1110	0	0	NA	NA
## 1111	0	0	NA	NA

```
bank = bank[!is.na(bank$deposit),]
```

```
bank = bank[!is.na(bank$balance),]
```