

18845	2	2
18850	1	1
18857	1	2
18868	1	2
18884	3	2
18891	3	3
18893	1	1
18916	1	2
18934	1	2
18944	2	3
18945	2	2
18975	3	2
18988	1	2
19039	2	3
19046	1	3
19048	2	3
19063	2	2
19066	2	3
19070	1	1
19155	1	2
19186	2	1
19210	1	1
19237	1	1
19276	2	2
19295	1	1
19406	3	3
19421	2	3
19457	1	1
19459	2	1
19515	2	2
19620	1	2
19801	1	1
19975	1	2
20120	1	1
20121	1	3
20177	3	3
20208	2	2
20250	1	1
20257	1	1
20259	2	2
20392	1	2
20530	1	1
20537	2	3
20596	2	1
20650	2	2
20685	2	2
20694	1	2
20700	2	1
20728	1	2
20751	1	1
20753	3	3
20759	3	2
20763	1	1
20768	3	2
20775	1	2
20946	2	2
21040	1	2
21080	2	1
21083	2	2
21125	2	3
21149	2	2
21231	1	1
21257	1	1

21324	2	2
21464	1	3
21473	1	2
21518	1	1
21535	2	3
21711	2	1
21713	2	3
21729	2	1
21746	2	3
21754	2	2
21793	3	2
21818	2	2
21832	2	2
22016	3	3
22069	3	2
22100	1	1
22130	2	1
22220	2	3
22229	3	2
22387	2	3
22421	1	1
22614	1	1
22626	2	2
22639	3	2
22661	2	1
22679	1	1
22697	1	1
22791	1	2
22816	2	1
22876	1	1
22927	2	3
22966	3	3
22980	2	2
22994	3	2
23141	2	2
23189	2	2
23211	2	2
23283	2	2
23316	3	1
23375	2	2
23499	1	2
23528	2	2
23588	2	2
23601	1	2
23645	1	2
23665	2	3
23882	2	2
23945	2	1
23946	1	1
23955	2	2
23981	1	1
23990	2	3
24055	2	2
24082	2	1
24105	2	2
24176	1	2
24180	2	2
24205	2	2
24266	2	2
24333	2	2
24335	2	2
24473	2	3
24507	2	3

24512	2	2
24520	2	2
24551	2	2
24558	3	3
24583	2	2
24595	2	2
24635	2	1
24640	2	2
24652	2	2
24653	1	2
24680	3	2
24681	2	2
24692	3	2
24745	2	2
24788	2	2
24789	1	2
24838	2	2
24883	2	3
25003	3	3
25193	2	2
25233	3	3
25260	3	3
25265	2	2
25506	3	2
25610	3	3
25629	2	2
25663	3	3
25709	2	2
25711	2	2
25715	2	2
25749	2	3
25807	2	3
25848	1	1
25881	2	1
25912	2	2
25935	3	1
25998	1	2
26010	2	2
26038	3	3
26040	2	3
26047	3	2
26050	2	2
26088	2	3
26107	2	2
26110	2	1
26122	3	3
26151	3	2
26179	2	2
26205	3	2
26260	2	2
26276	1	2
26319	2	1
26321	2	2
26419	3	3
26528	3	2
26604	1	2
26649	3	3
26674	2	2
26711	2	2
26769	2	2
26852	1	2
26937	2	3
26985	1	2

26993	1	2
27003	2	3
27015	2	2
27032	2	2
27034	3	3
27035	3	3
27064	1	2
27103	3	3
27132	2	3
27139	1	1
27159	2	3
27175	3	3
27186	3	3
27207	2	2
27208	2	3
27226	2	2
27307	3	3
27428	3	2
27454	2	3
27463	2	1
27474	2	3
27499	2	2
27527	3	1
27555	2	2
27598	2	2
27609	3	3
27709	2	2
27735	2	2
27754	3	3
27790	3	2
27815	2	2
27836	2	2
27842	1	2
27845	2	1
27848	3	3
27903	1	2
27916	3	3
27919	2	2
27928	1	2
27955	2	2
27989	3	3
28003	2	2
28033	3	3
28047	2	2
28052	2	2
28056	3	2
28057	2	2
28072	3	3
28076	2	1
28081	2	2
28087	3	2
28088	1	2
28093	3	3
28098	2	2
28103	2	3
28107	2	2
28111	2	2
28115	2	2
28119	2	2
28123	3	3
28149	3	1
28193	3	3
28211	2	3

28281	1	2
28375	3	3
28390	2	2
28406	2	2
28421	2	3
28422	3	3
28438	2	2
28444	3	3
28464	2	2
28472	3	2
28508	3	2
28522	2	2
28526	3	3
28539	2	2
28657	3	2
28680	3	3
28714	2	3
28729	2	2
28737	2	1
28756	2	1
28759	2	3
28832	2	2
28843	2	2
28879	2	1
28929	3	1
28982	3	3
28984	2	2
29009	2	3
29045	2	2
29098	1	2
29192	2	2
29222	1	1
29249	3	2
29302	2	2
29309	3	3
29317	3	2
29357	3	3
29370	3	3
29371	2	2
29464	2	2
29505	2	3
29534	3	3
29541	2	1
29596	1	2
29603	2	3
29632	2	2
29685	2	2
29697	2	2
29738	2	2
29800	3	1
29801	3	2
29805	3	3
29815	3	3
29822	2	2
29850	2	2
29852	3	3
29956	1	1
29977	3	2
29985	3	3
30067	2	2
30083	2	1
30103	2	2
30129	2	2

30242	3	3
30306	2	3
30310	2	2
30317	3	3
30374	2	2
30380	1	1
30382	3	3
30394	2	2
30438	2	2
30473	2	3
30493	3	3
30508	1	3
30515	2	2
30518	2	3
30524	2	2
30552	2	2
30565	1	1
30602	3	2
30666	1	1
30667	2	2
30681	2	2
30709	1	2
30762	2	2
30791	3	1
30792	3	2
30812	2	1
30815	2	3
30839	1	2
30861	3	2
30884	3	1
30913	3	3
30924	2	2
30996	3	3
30997	2	2
31006	2	2
31042	2	3
31053	2	2
31076	3	3
31082	2	1
31107	3	3
31151	3	1
31156	2	3
31179	3	3
31221	3	2
31256	3	1
31261	1	3
31264	3	2
31275	3	3
31280	2	2
31325	1	2
31333	3	2
31350	2	2
31418	3	3
31423	3	3
31429	3	1
31445	3	2
31493	3	2
31500	1	3
31515	2	2
31520	1	1
31528	1	1
31537	3	2
31554	3	2

31611 3 2  
31617 1 2  
31694 2 2  
31738 3 2  
31799 2 1  
31822 3 3  
31876 3 2  
31882 3 2  
31901 3 1  
31998 1 2  
32050 2 1  
32066 3 3  
32075 1 1  
32090 1 1  
32095 2 2  
32154 1 3  
32201 3 3  
32224 2 2  
32272 3 2  
32273 2 2  
32275 2 2  
32281 3 3  
32291 3 3  
32299 2 2  
32308 3 3  
32381 2 2  
32384 2 3  
32413 2 2  
32447 2 2  
32455 1 2  
32494 2 1  
32552 1 1  
32621 1 1  
32675 1 2  
32708 2 2  
32816 2 3  
32825 2 2  
32867 1 1  
32908 1 1  
33004 2 2  
33007 2 2  
33053 2 3  
33089 2 2  
33102 2 2  
33198 2 2  
33252 3 3  
33299 2 2  
33333 2 3  
33355 1 2  
33419 3 3  
33476 2 2  
33488 2 2  
33603 2 3  
33630 1 2  
33639 2 2  
33699 2 3  
33716 1 1  
33721 2 2  
33729 2 3  
33737 3 2  
33753 2 2  
33767 1 1  
33781 3 3

33789	2	2
33801	3	2
33832	2	2
33894	2	1
33896	2	2
33901	3	2
33916	2	2
33922	2	2
33924	3	3
33930	2	3
33945	3	2
33995	2	2
33998	1	3
34024	3	3
34060	2	3
34067	3	2
34086	2	2
34093	1	1
34101	1	1
34104	3	3
34105	3	2
34107	2	2
34112	2	2
34131	2	2
34133	2	3
34190	2	2
34195	3	2
34205	3	2
34220	3	1
34245	1	2
34282	2	3
34317	3	3
34319	3	3
34338	3	3
34350	2	2
34353	2	3
34372	2	2
34397	3	3
34474	2	2
34589	3	3
34656	2	1
34670	3	3
34701	2	2
34748	2	1
34799	2	1
34812	2	3
34850	1	3
34876	2	1
34928	1	2
35051	2	3
35060	2	2
35062	2	2
35116	1	2
35257	2	2
35298	2	2
35319	1	2
35380	2	2
35401	1	2
35415	2	1
35427	1	2
35433	2	2
35439	2	2
35460	1	1



35476	3	3
35510	3	2
35543	3	3
35572	2	3
35597	2	1
35622	1	2
35646	2	3
35656	2	2
35671	3	2
35712	1	2
35739	2	1
35749	3	3
35763	3	1
35771	2	2
35774	1	1
35826	2	2
35835	3	2
35867	2	1
35872	2	3
35886	1	3
35914	2	3
36089	2	2
36091	2	2
36128	3	2
36142	2	2
36143	2	1
36167	2	1
36192	3	2
36194	2	2
36238	3	2
36245	1	1
36254	1	1
36322	2	2
36339	2	2
36370	2	2
36440	2	2
36445	2	1
36488	2	2
36538	2	1
36752	2	2
36787	2	2
36799	2	2
36849	1	1
36861	2	2
36862	2	2
36912	2	1
36942	2	1
36982	3	1
36986	1	1
37130	1	1
37169	2	2
37311	1	2
37401	2	1
37464	1	2
37505	2	1
37522	2	2
37551	2	2
37590	1	1
37603	2	2
37615	2	2
37641	2	3
37695	2	2
37698	2	1

37721	1	2
37800	2	2
37863	3	3
37878	2	2
37880	2	2
37970	2	1
38001	2	2
38109	3	3
38227	3	2
38256	1	1
38304	2	2
38318	3	3
38356	2	3
38377	2	1
38383	2	3
38439	1	2
38522	2	2
38883	2	2
38902	2	1
38962	2	1
39012	2	2
39014	3	3
39015	2	1
39050	2	2
39057	3	3
39070	2	2
39072	2	2
39074	2	2
39082	2	2
39087	2	3
39088	2	1
39099	3	3
39104	3	3
39106	2	2
39113	2	1
39125	2	2
39196	2	2
39220	2	2
39258	1	2
39287	2	2
39333	2	2
39350	1	1
39384	3	3
39386	2	2
39406	3	2
39417	3	3
39427	2	2
39460	2	1
39534	3	3
39565	3	1
39581	3	2
39592	2	2
39593	3	3
39605	3	3
39616	2	2
39617	3	3
39627	3	2
39639	2	3
39662	3	3
39677	1	2
39689	3	2
39702	1	1
39718	2	2

39729	3	3
39738	2	3
39773	2	2
39804	3	2
39822	3	2
39844	3	3
39855	2	3
39881	3	3
39930	2	2
40110	1	3
40119	2	2
40151	2	1
40193	2	2
40205	1	1
40242	2	2
40263	2	2
40291	2	2
40300	2	3
40305	2	3
40306	3	2
40312	2	1
40328	2	2
40394	2	3
40407	2	3
40411	1	2
40441	2	2
40464	1	2
40465	3	2
40467	2	1
40481	2	2
40513	2	1
40524	2	2
40538	3	3
40539	1	2
40560	3	3
40589	3	3
40601	2	3
40613	3	3
40648	2	2
40675	1	2
40676	2	1
40680	1	2
40688	2	2
40704	1	2
40709	2	1
40726	1	3
40745	2	2
40751	3	2
40757	2	2
40760	1	2
40783	1	2
40786	1	3
40798	3	3
40799	2	2
40800	1	2
40802	3	2
40804	3	2
40838	2	2
40846	2	1
40869	3	3
40923	2	2
40925	2	2
40941	2	2

40967 3 2  
41058 2 2  
41066 2 2  
41068 2 3  
41080 3 2  
41086 1 1  
41097 2 3  
41101 3 3  
41112 2 2  
41121 3 1  
41130 2 1  
41157 3 1  
41198 1 2  
41223 2 2  
41227 2 3  
41245 3 3  
41257 3 2  
41272 3 2  
41274 2 3  
41294 1 3  
41304 3 3  
41358 3 1  
41376 3 3  
41381 2 2  
41384 1 2  
41385 2 2  
41432 2 3  
41440 1 2  
41444 2 2  
41462 1 3  
41471 2 2  
41486 2 2  
41488 3 2  
41492 2 1  
41498 3 1  
41520 3 1  
41525 2 1  
41540 1 2  
41552 2 2  
41555 1 1  
41591 3 3  
41620 2 1  
41651 3 2  
41675 3 3  
41704 3 3  
41705 3 3  
41724 2 3  
41726 2 2  
41734 2 1  
41739 1 3  
41754 1 1  
41784 2 2  
41856 2 2  
41859 1 1  
41885 2 2  
41889 3 2  
41891 3 2  
41904 1 1  
41934 2 2  
41935 1 2  
41947 1 1  
41959 2 3  
41964 1 3

41986	3	3
41990	3	2
41996	1	1
42000	2	2
42006	1	2
42024	2	3
42028	2	2
42042	2	3
42091	2	1
42123	3	2
42137	1	3
42182	1	1
42223	1	2
42256	1	2
42261	2	2
42264	2	1
42292	2	2
42294	3	1
42296	2	2
42303	3	2
42306	2	3
42325	2	2
42342	2	1
42362	3	3
42385	1	3
42386	2	3
42395	3	3
42409	1	3
42415	3	2
42418	1	2
42422	2	2
42441	1	1
42462	1	3
42471	3	3
42514	3	3
42525	2	3
42549	2	2
42573	3	3
42576	2	2
42591	2	2
42617	1	1
42620	1	1
42646	3	3
42669	2	3
42696	2	2
42728	2	2
42740	2	3
42741	2	2
42747	3	3
42749	2	2
42751	3	3
42752	1	2
42766	1	2
42776	2	2
42797	2	2
42817	3	3
42821	3	3
42836	3	3
42844	1	1
42860	1	2
42864	1	1
42905	3	3
42909	2	2

42924 1 3  
42938 2 1  
42947 3 3  
42955 2 3  
42973 3 2  
43038 2 1  
43069 3 3  
43080 2 2  
43090 3 2  
43095 3 3  
43132 2 2  
43138 2 2  
43144 2 2  
43147 3 3  
43152 3 3  
43162 2 2  
43168 1 3  
43196 3 2  
43206 1 2  
43240 3 2  
43242 2 3  
43247 1 1  
43249 1 1  
43258 3 3  
43259 2 2  
43267 2 2  
43294 2 3  
43307 3 3  
43322 2 2  
43354 2 2  
43397 2 3  
43416 3 3  
43426 1 2  
43433 2 3  
43454 1 2  
43471 3 3  
43487 2 3  
43497 2 3  
43517 2 2  
43524 2 2  
43532 2 3  
43536 1 1  
43556 3 1  
43564 2 2  
43570 2 2  
43620 3 3  
43634 3 1  
43638 3 3  
43654 1 3  
43658 2 2  
43684 2 2  
43709 1 3  
43710 3 2  
43754 2 2  
43761 1 1  
43775 2 3  
43798 3 2  
43809 2 2  
43827 3 2  
43840 3 1  
43850 2 2  
43878 1 2  
43905 3 2

43908 3 2  
43911 3 2  
43912 3 2  
43932 2 2  
43964 3 3  
43972 2 3  
43977 2 2  
43982 2 2  
43984 2 2  
44002 1 2  
44017 3 3  
44068 2 3  
44084 2 3  
44096 3 2  
44110 2 2  
44114 2 1  
44116 3 2  
44121 1 3  
44122 2 3  
44123 1 1  
44133 1 2  
44156 3 3  
44160 2 2  
44176 2 2  
44229 3 3  
44230 2 2  
44263 1 1  
44290 2 2  
44299 2 2  
44312 2 3  
44332 2 2  
44338 2 2  
44339 3 3  
44355 2 2  
44373 2 1  
44374 2 2  
44375 3 2  
44380 3 2  
44406 3 2  
44411 1 1  
44421 1 1  
44487 2 2  
44494 3 2  
44501 2 3  
44534 1 2  
44539 3 2  
44546 2 2  
44591 2 2  
44645 2 2  
44652 3 2  
44663 2 2  
44688 3 3  
44691 2 2  
44713 3 3  
44738 3 3  
44743 2 1  
44763 1 2  
44780 1 1  
44790 2 2  
44791 2 2  
44797 3 3  
44805 2 3  
44817 3 3

```
> #Now we can get back the completed dataset using the complete() function.
> bank_data4 <- complete(bank_data3,1)
> md.pattern(bank_data4)
```

$$\begin{array}{ccc} \{ & & \} \\ \wedge & \text{---} & \wedge \\ \{ & & \} \\ 0 & & 0 \\ \Rightarrow & V & \Leftarrow \\ \backslash & \backslash & / \\ & \text{---} & \end{array}$$

No need for mice. This data set is completely observed.

[illegible]

```

duration campaign pdays previous y
45211      1      1      1      1 1 0
          0      0      0      0 0 0

```

```
> #b. Show a distribution of clients based on a job.
```

```
> hist(bank_data1$job)
```

```
> bank_data4 <- bank_data4 %>%
```

```
+ mutate(
```

```
+ job = as.numeric(job),
```

```
+ education = as.numeric(education),
```

+

+

```
+ )
> cor(bank_data4$job,bank_data4$marital, method = 'spearman')
```

```
[1] 0.05628102
```

> #Correlation between job and Marital is 0.056% hence we can say that there

```
> #is no correlation between them.
```

```
> #d. Check whether is there any association between Job and
```

```
> #Education?
```

```
> cor(bank_data4$job,bank_data4$education, method = 'spearman')
```

```
[1] 0.1912358
```

>

>