

FML_ASS1

2023-09-09

```
vin <- read.csv("supply_chain_data.csv")
head(vin)
```

```

## Product.type SKU      Price Availability Number.of.products.sold
## 1   haircare SKU0 69.808006      55          802
## 2   skincare SKU1 14.843523      95          736
## 3   haircare SKU2 11.319683      34           8
## 4   skincare SKU3 61.163343      68          83
## 5   skincare SKU4 4.805496       26          871
## 6   haircare SKU5 1.699976      87          147
## Revenue.generated Customer.demographics Stock.levels Lead.times
## 1     8661.997      Non-binary      58          7
## 2     7460.900      Female        53         30
## 3     9577.750      Unknown        1         10
## 4     7766.836      Non-binary      23         13
## 5     2686.505      Non-binary      5          3
## 6     2828.349      Non-binary      90         27
## Order.quantities Shipping.times Shipping.carriers Shipping.costs
## 1       96            4      Carrier B  2.956572
## 2       37            2      Carrier A  9.716575
## 3       88            2      Carrier B  8.054479
## 4       59            6      Carrier C  1.729569
## 5       56            8      Carrier A  3.890548
## 6       66            3      Carrier B  4.444099
## Supplier.name Location Lead.time Production.volumes Manufacturing.lead.time
## 1   Supplier 3   Mumbai      29          215          29
## 2   Supplier 3   Mumbai      23          517          30
## 3   Supplier 1   Mumbai      12          971          27
## 4   Supplier 5   Kolkata     24          937          18
## 5   Supplier 1   Delhi       5          414          3
## 6   Supplier 4   Bangalore   10          104          17
## Manufacturing.costs Inspection.results Defect.rates Transportation.modes
## 1     46.27988      Pending    0.2264104      Road
## 2     33.61677      Pending    4.8540680      Road
## 3     30.68802      Pending    4.5805926      Air
## 4     35.62474      Fail      4.7466486      Rail
## 5     92.06516      Fail      3.1455795      Air
## 6     56.76648      Fail      2.7791935      Road
## Routes Costs
## 1 Route B 187.7521
## 2 Route B 503.0656
## 3 Route C 141.9203
## 4 Route A 254.7762
## 5 Route A 923.4406
## 6 Route A 235.4612

```

```
summary(vin$Availability)
```

```

## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 1.00 22.75 43.50 48.40 75.00 100.00

```

```
table(vin$Product.type)
```

```
##  
## cosmetics  haircare  skincare  
##          26         34         40
```

```
print(vin)
```

##	Product.type	SKU	Price	Availability	Number.of.products.sold
## 1	haircare	SKU0	69.808006	55	802
## 2	skincare	SKU1	14.843523	95	736
## 3	haircare	SKU2	11.319683	34	8
## 4	skincare	SKU3	61.163343	68	83
## 5	skincare	SKU4	4.805496	26	871
## 6	haircare	SKU5	1.699976	87	147
## 7	skincare	SKU6	4.078333	48	65
## 8	cosmetics	SKU7	42.958384	59	426
## 9	cosmetics	SKU8	68.717597	78	150
## 10	skincare	SKU9	64.015733	35	980
## 11	skincare	SKU10	15.707796	11	996
## 12	skincare	SKU11	90.635460	95	960
## 13	haircare	SKU12	71.213389	41	336
## 14	skincare	SKU13	16.160393	5	249
## 15	skincare	SKU14	99.171329	26	562
## 16	skincare	SKU15	36.989245	94	469
## 17	skincare	SKU16	7.547172	74	280
## 18	cosmetics	SKU17	81.462534	82	126
## 19	haircare	SKU18	36.443628	23	620
## 20	skincare	SKU19	51.123870	100	187
## 21	skincare	SKU20	96.341072	22	320
## 22	cosmetics	SKU21	84.893869	60	601
## 23	haircare	SKU22	27.679781	55	884
## 24	cosmetics	SKU23	4.324341	30	391
## 25	haircare	SKU24	4.156308	32	209
## 26	haircare	SKU25	39.629344	73	142
## 27	haircare	SKU26	97.446947	9	353
## 28	cosmetics	SKU27	92.557361	42	352
## 29	cosmetics	SKU28	2.397275	12	394
## 30	cosmetics	SKU29	63.447559	3	253
## 31	haircare	SKU30	8.022859	10	327
## 32	skincare	SKU31	50.847393	28	168
## 33	skincare	SKU32	79.209936	43	781
## 34	cosmetics	SKU33	64.795435	63	616
## 35	skincare	SKU34	37.467592	96	602
## 36	cosmetics	SKU35	84.957787	11	449
## 37	skincare	SKU36	9.813003	34	963
## 38	skincare	SKU37	23.399845	5	963
## 39	cosmetics	SKU38	52.075931	75	705
## 40	skincare	SKU39	19.127477	26	176
## 41	skincare	SKU40	80.541424	97	933
## 42	skincare	SKU41	99.113292	35	556
## 43	skincare	SKU42	46.529168	98	155
## 44	haircare	SKU43	11.743272	6	598
## 45	cosmetics	SKU44	51.355791	34	919
## 46	haircare	SKU45	33.784138	1	24
## 47	haircare	SKU46	27.082207	75	859
## 48	skincare	SKU47	95.712136	93	910
## 49	haircare	SKU48	76.035544	28	29
## 50	cosmetics	SKU49	78.897913	19	99
## 51	cosmetics	SKU50	14.203484	91	633

## 52	haircare	SKU51	26.700761	61	154
## 53	skincare	SKU52	98.031830	1	820
## 54	skincare	SKU53	30.341471	93	242
## 55	haircare	SKU54	31.146243	11	622
## 56	haircare	SKU55	79.855058	16	701
## 57	skincare	SKU56	20.986386	90	93
## 58	haircare	SKU57	49.263205	65	227
## 59	skincare	SKU58	59.841561	81	896
## 60	cosmetics	SKU59	63.828398	30	484
## 61	skincare	SKU60	17.028028	16	380
## 62	haircare	SKU61	52.028750	23	117
## 63	cosmetics	SKU62	72.796354	89	270
## 64	skincare	SKU63	13.017377	55	246
## 65	skincare	SKU64	89.634096	11	134
## 66	skincare	SKU65	33.697717	72	457
## 67	skincare	SKU66	26.034870	52	704
## 68	skincare	SKU67	87.755432	16	513
## 69	haircare	SKU68	37.931812	29	163
## 70	skincare	SKU69	54.865529	62	511
## 71	haircare	SKU70	47.914542	90	32
## 72	cosmetics	SKU71	6.381533	14	637
## 73	cosmetics	SKU72	90.204428	88	478
## 74	cosmetics	SKU73	83.851018	41	375
## 75	haircare	SKU74	3.170011	64	904
## 76	skincare	SKU75	92.996884	29	106
## 77	haircare	SKU76	69.108800	23	241
## 78	haircare	SKU77	57.449743	14	359
## 79	haircare	SKU78	6.306883	50	946
## 80	haircare	SKU79	57.057031	56	198
## 81	skincare	SKU80	91.128318	75	872
## 82	haircare	SKU81	72.819207	9	774
## 83	skincare	SKU82	17.034931	13	336
## 84	haircare	SKU83	68.911246	82	663
## 85	haircare	SKU84	89.104367	99	618
## 86	cosmetics	SKU85	76.962994	83	25
## 87	skincare	SKU86	19.998177	18	223
## 88	haircare	SKU87	80.414037	24	79
## 89	cosmetics	SKU88	75.270407	58	737
## 90	cosmetics	SKU89	97.760086	10	134
## 91	skincare	SKU90	13.881914	56	320
## 92	cosmetics	SKU91	62.111965	90	916
## 93	cosmetics	SKU92	47.714233	44	276
## 94	haircare	SKU93	69.290831	88	114
## 95	cosmetics	SKU94	3.037689	97	987
## 96	haircare	SKU95	77.903927	65	672
## 97	cosmetics	SKU96	24.423131	29	324
## 98	haircare	SKU97	3.526111	56	62
## 99	skincare	SKU98	19.754605	43	913
## 100	haircare	SKU99	68.517833	17	627
<hr/>					
## 1	Revenue.generated	Customer.demographics	Stock.levels	Lead.times	
## 1	8661.997	Non-binary	58	7	
## 2	7460.900	Female	53	30	

## 3	9577.750	Unknown	1	10
## 4	7766.836	Non-binary	23	13
## 5	2686.505	Non-binary	5	3
## 6	2828.349	Non-binary	90	27
## 7	7823.477	Male	11	15
## 8	8496.104	Female	93	17
## 9	7517.363	Female	5	10
## 10	4971.146	Unknown	14	27
## 11	2330.966	Non-binary	51	13
## 12	6099.944	Female	46	23
## 13	2873.741	Unknown	100	30
## 14	4052.738	Male	80	8
## 15	8653.571	Non-binary	54	29
## 16	5442.087	Non-binary	9	8
## 17	6453.798	Female	2	5
## 18	2629.396	Female	45	17
## 19	9364.674	Unknown	10	10
## 20	2553.496	Unknown	48	11
## 21	8128.028	Unknown	27	12
## 22	7087.053	Unknown	69	25
## 23	2390.808	Unknown	71	1
## 24	8858.368	Unknown	84	5
## 25	9049.078	Male	4	26
## 26	2174.777	Male	82	11
## 27	3716.493	Male	59	16
## 28	2686.457	Unknown	47	9
## 29	6117.325	Female	48	15
## 30	8318.903	Female	45	5
## 31	2766.342	Male	60	26
## 32	9655.135	Male	6	17
## 33	9571.550	Unknown	89	13
## 34	5149.998	Non-binary	4	17
## 35	9061.711	Unknown	1	26
## 36	6541.329	Female	42	27
## 37	7573.402	Female	18	23
## 38	2438.340	Female	25	8
## 39	9692.318	Non-binary	69	1
## 40	1912.466	Female	78	29
## 41	5724.959	Female	90	20
## 42	5521.205	Female	64	19
## 43	1839.609	Female	22	27
## 44	5737.426	Unknown	36	29
## 45	7152.286	Female	13	19
## 46	5267.957	Male	93	7
## 47	2556.767	Non-binary	92	29
## 48	7089.474	Male	4	15
## 49	7397.071	Non-binary	30	16
## 50	8001.613	Unknown	97	24
## 51	5910.885	Female	31	23
## 52	9866.465	Male	100	4
## 53	9435.763	Male	64	11
## 54	8232.335	Male	96	25

## 55	6088.021	Non-binary	33	22
## 56	2925.675	Male	97	11
## 57	4767.020	Non-binary	25	23
## 58	1605.867	Unknown	5	18
## 59	2021.150	Non-binary	10	5
## 60	1061.619	Non-binary	100	16
## 61	8864.084	Female	41	27
## 62	6885.589	Unknown	32	23
## 63	3899.747	Unknown	86	2
## 64	4256.949	Non-binary	54	19
## 65	8458.731	Female	73	27
## 66	8354.580	Male	57	24
## 67	8367.722	Female	13	17
## 68	9473.798	Unknown	12	9
## 69	3550.218	Non-binary	0	8
## 70	1752.381	Non-binary	95	1
## 71	7014.888	Female	10	12
## 72	8180.337	Female	76	2
## 73	2633.122	Non-binary	57	29
## 74	7910.887	Male	17	25
## 75	5709.945	Female	41	6
## 76	1889.074	Non-binary	16	20
## 77	5328.376	Male	38	1
## 78	2483.760	Unknown	96	28
## 79	1292.458	Unknown	5	4
## 80	7888.723	Non-binary	31	25
## 81	8651.673	Unknown	39	14
## 82	4384.413	Unknown	48	6
## 83	2943.382	Unknown	42	19
## 84	2411.755	Unknown	65	24
## 85	2048.290	Unknown	73	26
## 86	8684.613	Female	15	18
## 87	1229.591	Unknown	32	14
## 88	5133.847	Male	5	7
## 89	9444.742	Male	60	18
## 90	5924.683	Unknown	90	1
## 91	9592.634	Non-binary	66	18
## 92	1935.207	Male	98	22
## 93	2100.130	Male	90	25
## 94	4531.402	Unknown	63	17
## 95	7888.357	Unknown	77	26
## 96	7386.364	Unknown	15	14
## 97	7698.425	Non-binary	67	2
## 98	4370.917	Male	46	19
## 99	8525.953	Female	53	1
## 100	9185.186	Unknown	55	8
## Order.quantities Shipping.times Shipping.carriers Shipping.costs				
## 1	96	4	Carrier B	2.956572
## 2	37	2	Carrier A	9.716575
## 3	88	2	Carrier B	8.054479
## 4	59	6	Carrier C	1.729569
## 5	56	8	Carrier A	3.890548

## 6	66	3	Carrier B	4.444099
## 7	58	8	Carrier C	3.880763
## 8	11	1	Carrier B	2.348339
## 9	15	7	Carrier C	3.404734
## 10	83	1	Carrier A	7.166645
## 11	80	2	Carrier C	8.673211
## 12	60	1	Carrier A	4.523943
## 13	85	4	Carrier A	1.325274
## 14	48	9	Carrier A	9.537283
## 15	78	5	Carrier B	2.039770
## 16	69	7	Carrier B	2.422040
## 17	78	1	Carrier B	4.191325
## 18	85	9	Carrier C	3.585419
## 19	46	8	Carrier C	4.339225
## 20	94	3	Carrier A	4.742636
## 21	68	6	Carrier A	8.878335
## 22	7	6	Carrier B	6.037884
## 23	63	10	Carrier A	9.567649
## 24	29	7	Carrier A	2.924858
## 25	2	8	Carrier C	9.741292
## 26	52	3	Carrier C	2.231074
## 27	48	4	Carrier B	6.507549
## 28	62	8	Carrier C	7.406751
## 29	24	4	Carrier B	9.898141
## 30	67	7	Carrier B	8.100973
## 31	35	7	Carrier B	8.954528
## 32	44	4	Carrier B	2.679661
## 33	64	4	Carrier C	6.599105
## 34	95	9	Carrier C	4.858271
## 35	21	7	Carrier A	1.019488
## 36	85	8	Carrier C	5.288190
## 37	28	3	Carrier B	2.107951
## 38	21	9	Carrier A	1.532655
## 39	88	5	Carrier B	9.235931
## 40	34	3	Carrier A	5.562504
## 41	39	8	Carrier C	7.229595
## 42	38	8	Carrier B	5.773264
## 43	57	4	Carrier C	7.526248
## 44	85	9	Carrier B	3.694021
## 45	72	6	Carrier C	7.577450
## 46	52	6	Carrier B	5.215155
## 47	6	8	Carrier B	4.070956
## 48	51	9	Carrier B	8.978751
## 49	9	3	Carrier C	7.095833
## 50	9	6	Carrier C	2.505621
## 51	82	10	Carrier A	6.247861
## 52	52	1	Carrier A	4.783001
## 53	11	1	Carrier B	8.631052
## 54	54	3	Carrier B	1.013487
## 55	61	3	Carrier B	4.305103
## 56	11	5	Carrier A	5.014365
## 57	83	5	Carrier C	1.774430

## 58	51	1	Carrier B	9.160559
## 59	44	7	Carrier A	4.938439
## 60	26	7	Carrier B	7.293723
## 61	72	8	Carrier C	4.381368
## 62	36	7	Carrier C	9.030340
## 63	40	7	Carrier C	7.291701
## 64	10	4	Carrier A	2.457934
## 65	75	6	Carrier C	4.585353
## 66	54	8	Carrier C	6.580541
## 67	19	8	Carrier A	2.216143
## 68	71	9	Carrier C	9.147812
## 69	58	8	Carrier B	1.194252
## 70	27	3	Carrier B	9.705287
## 71	22	4	Carrier B	6.315718
## 72	26	6	Carrier A	9.228190
## 73	77	9	Carrier A	6.599614
## 74	66	5	Carrier B	1.512937
## 75	1	5	Carrier A	5.237655
## 76	56	10	Carrier C	2.473898
## 77	22	10	Carrier A	7.054538
## 78	57	4	Carrier B	6.780947
## 79	51	5	Carrier B	8.467050
## 80	20	1	Carrier B	6.496325
## 81	41	2	Carrier C	2.833185
## 82	8	5	Carrier B	4.066278
## 83	72	1	Carrier A	4.708182
## 84	7	8	Carrier B	4.949840
## 85	80	10	Carrier A	8.381616
## 86	66	2	Carrier C	8.249169
## 87	22	6	Carrier B	1.454305
## 88	55	10	Carrier A	6.575804
## 89	85	7	Carrier A	3.801253
## 90	27	8	Carrier B	9.929816
## 91	96	7	Carrier B	7.674431
## 92	85	7	Carrier B	7.471514
## 93	10	8	Carrier B	4.469500
## 94	66	1	Carrier C	7.006432
## 95	72	9	Carrier B	6.942946
## 96	26	9	Carrier B	8.630339
## 97	32	3	Carrier C	5.352878
## 98	4	9	Carrier A	7.904846
## 99	27	7	Carrier B	1.409801
## 100	59	6	Carrier B	1.311024

##	Supplier.name	Location	Lead.time	Production.volumes
## 1	Supplier 3	Mumbai	29	215
## 2	Supplier 3	Mumbai	23	517
## 3	Supplier 1	Mumbai	12	971
## 4	Supplier 5	Kolkata	24	937
## 5	Supplier 1	Delhi	5	414
## 6	Supplier 4	Bangalore	10	104
## 7	Supplier 3	Kolkata	14	314
## 8	Supplier 4	Bangalore	22	564

## 9	Supplier 4	Mumbai	13	769
## 10	Supplier 2	Chennai	29	963
## 11	Supplier 5	Kolkata	18	830
## 12	Supplier 2	Kolkata	28	362
## 13	Supplier 4	Kolkata	3	563
## 14	Supplier 5	Bangalore	23	173
## 15	Supplier 1	Kolkata	25	558
## 16	Supplier 1	Bangalore	14	580
## 17	Supplier 1	Bangalore	3	399
## 18	Supplier 1	Chennai	7	453
## 19	Supplier 2	Kolkata	18	374
## 20	Supplier 4	Chennai	20	694
## 21	Supplier 1	Chennai	29	309
## 22	Supplier 5	Chennai	19	791
## 23	Supplier 4	Kolkata	22	780
## 24	Supplier 5	Kolkata	11	568
## 25	Supplier 2	Bangalore	28	447
## 26	Supplier 4	Kolkata	19	934
## 27	Supplier 2	Bangalore	26	171
## 28	Supplier 5	Mumbai	25	291
## 29	Supplier 1	Mumbai	13	171
## 30	Supplier 1	Kolkata	16	329
## 31	Supplier 4	Kolkata	27	806
## 32	Supplier 3	Chennai	24	461
## 33	Supplier 3	Kolkata	30	737
## 34	Supplier 5	Chennai	1	251
## 35	Supplier 1	Chennai	4	452
## 36	Supplier 1	Delhi	3	367
## 37	Supplier 2	Delhi	26	671
## 38	Supplier 3	Kolkata	24	867
## 39	Supplier 5	Mumbai	10	841
## 40	Supplier 2	Kolkata	30	791
## 41	Supplier 1	Kolkata	18	793
## 42	Supplier 4	Chennai	18	892
## 43	Supplier 5	Bangalore	26	179
## 44	Supplier 5	Mumbai	1	206
## 45	Supplier 2	Delhi	7	834
## 46	Supplier 2	Chennai	25	794
## 47	Supplier 3	Chennai	18	870
## 48	Supplier 1	Kolkata	10	964
## 49	Supplier 2	Mumbai	9	109
## 50	Supplier 5	Delhi	28	177
## 51	Supplier 2	Delhi	20	306
## 52	Supplier 5	Bangalore	18	673
## 53	Supplier 1	Mumbai	10	727
## 54	Supplier 1	Delhi	1	631
## 55	Supplier 1	Kolkata	26	497
## 56	Supplier 2	Delhi	27	918
## 57	Supplier 1	Mumbai	24	826
## 58	Supplier 2	Delhi	21	588
## 59	Supplier 3	Delhi	18	396
## 60	Supplier 1	Kolkata	11	176

## 61	Supplier 4	Mumbai	29	929
## 62	Supplier 4	Kolkata	14	480
## 63	Supplier 2	Mumbai	13	751
## 64	Supplier 3	Bangalore	18	736
## 65	Supplier 1	Delhi	17	328
## 66	Supplier 5	Kolkata	16	358
## 67	Supplier 5	Kolkata	24	867
## 68	Supplier 1	Mumbai	10	198
## 69	Supplier 2	Bangalore	2	375
## 70	Supplier 4	Kolkata	9	862
## 71	Supplier 1	Bangalore	22	775
## 72	Supplier 2	Bangalore	2	258
## 73	Supplier 1	Bangalore	21	152
## 74	Supplier 4	Chennai	13	444
## 75	Supplier 4	Delhi	1	919
## 76	Supplier 1	Chennai	25	759
## 77	Supplier 2	Bangalore	25	985
## 78	Supplier 1	Kolkata	26	334
## 79	Supplier 5	Mumbai	25	858
## 80	Supplier 3	Bangalore	5	228
## 81	Supplier 3	Chennai	8	202
## 82	Supplier 3	Delhi	28	698
## 83	Supplier 2	Mumbai	6	955
## 84	Supplier 1	Bangalore	20	443
## 85	Supplier 5	Chennai	24	589
## 86	Supplier 5	Chennai	4	211
## 87	Supplier 1	Mumbai	4	569
## 88	Supplier 3	Chennai	27	523
## 89	Supplier 2	Mumbai	21	953
## 90	Supplier 1	Kolkata	23	370
## 91	Supplier 3	Bangalore	8	585
## 92	Supplier 4	Delhi	5	207
## 93	Supplier 2	Mumbai	4	671
## 94	Supplier 4	Chennai	21	824
## 95	Supplier 2	Delhi	12	908
## 96	Supplier 4	Mumbai	18	450
## 97	Supplier 3	Mumbai	28	648
## 98	Supplier 4	Mumbai	10	535
## 99	Supplier 5	Chennai	28	581
## 100	Supplier 2	Chennai	29	921
## 1	Manufacturing.lead.time	Manufacturing.costs	Inspection.results	Defect.rates
## 2	29	46.279879	Pending	0.22641036
## 3	30	33.616769	Pending	4.85406803
## 4	27	30.688019	Pending	4.58059262
## 5	18	35.624741	Fail	4.74664862
## 6	3	92.065161	Fail	3.14557952
## 7	17	56.766476	Fail	2.77919351
## 8	24	1.085069	Pending	1.00091062
## 9	1	99.466109	Fail	0.39817719
## 10	8	11.423027	Pending	2.70986269
## 11	23	47.957602	Pending	3.84461448
## 12	5	96.527353	Pass	1.72731393

## 12	11	27.592363	Pending	0.02116982
## 13	3	32.321286	Fail	2.16125375
## 14	10	97.829050	Pending	1.63107423
## 15	14	5.791437	Pending	0.10068285
## 16	7	97.121282	Pass	2.26440576
## 17	21	77.106342	Pass	1.01256309
## 18	16	47.679680	Fail	0.10202075
## 19	17	27.107981	Pending	2.23193911
## 20	16	82.373321	Fail	3.64645087
## 21	6	65.686260	Pass	4.23141657
## 22	4	61.735729	Pending	0.01860757
## 23	28	50.120840	Fail	2.59127547
## 24	29	98.609957	Pending	1.34229156
## 25	3	40.382360	Pending	3.69131029
## 26	23	78.280383	Pending	3.79723122
## 27	4	15.972230	Pass	2.11931974
## 28	4	10.528245	Fail	2.86466784
## 29	7	59.429382	Fail	0.81575708
## 30	7	39.292876	Pass	3.87809894
## 31	30	51.634893	Pending	0.96539471
## 32	8	60.251146	Pending	2.98900001
## 33	7	29.692467	Pass	1.94603612
## 34	23	23.853428	Fail	3.54104601
## 35	10	10.754273	Pass	0.64660456
## 36	2	58.004787	Pass	0.54115410
## 37	19	45.531364	Fail	3.80553338
## 38	15	34.343277	Pending	2.61028808
## 39	12	5.930694	Pending	0.61332690
## 40	6	9.005807	Fail	1.45197220
## 41	1	88.179407	Pending	4.21326943
## 42	7	95.332065	Fail	0.04530226
## 43	7	96.422821	Fail	4.93925529
## 44	23	26.277366	Pending	0.37230477
## 45	18	22.554107	Fail	2.96262632
## 46	25	66.312544	Pass	3.21960461
## 47	23	77.322353	Pending	3.64861059
## 48	20	19.712993	Pending	0.38057359
## 49	18	23.126364	Fail	1.69811254
## 50	28	14.147815	Pass	2.82581399
## 51	21	45.178758	Fail	4.75480080
## 52	28	14.190328	Pending	1.77295117
## 53	27	9.166849	Pending	2.12247162
## 54	17	83.344059	Pending	1.41034758
## 55	29	30.186023	Pass	2.47877198
## 56	5	30.323545	Fail	4.54891966
## 57	28	12.836285	Pass	1.17375550
## 58	25	67.779623	Pending	2.51117483
## 59	7	65.047415	Fail	1.73037472
## 60	4	1.900762	Fail	0.44719402
## 61	24	87.213058	Fail	2.85309062
## 62	12	78.702394	Fail	4.36747054
## 63	14	21.048643	Pass	1.87400140

## 64	10	20.075004	Pending	3.63284329
## 65	6	8.693042	Fail	0.15948631
## 66	21	1.597223	Fail	4.91109595
## 67	28	42.084437	Fail	3.44806329
## 68	11	7.057876	Pass	0.13195544
## 69	18	97.113582	Fail	1.98346787
## 70	7	77.627766	Pending	1.36238799
## 71	16	11.440782	Pass	1.83057560
## 72	10	30.661677	Pending	2.07875061
## 73	11	55.760493	Pending	3.21332961
## 74	4	46.870239	Fail	4.62054606
## 75	9	80.580852	Fail	0.39661272
## 76	11	48.064783	Pass	2.03006909
## 77	24	64.323598	Pending	2.18003745
## 78	5	42.952445	Pass	3.05514182
## 79	21	71.126515	Pending	4.09688133
## 80	12	57.870903	Pending	0.16587163
## 81	5	76.961228	Fail	2.84966220
## 82	1	19.789593	Pending	2.54754712
## 83	26	4.465278	Pending	4.13787705
## 84	5	97.730594	Fail	0.77300613
## 85	22	33.808637	Pass	4.84345658
## 86	2	69.929346	Fail	1.37442900
## 87	18	74.608970	Pass	2.05151293
## 88	17	28.696997	Fail	3.69373779
## 89	11	68.184919	Pending	0.72220440
## 90	11	46.603873	Pending	1.90766573
## 91	8	85.675963	Pass	1.21938222
## 92	28	39.772883	Pending	0.62600186
## 93	29	62.612690	Pass	0.33343183
## 94	20	35.633652	Fail	4.16578180
## 95	14	60.387379	Pass	1.46360750
## 96	26	58.890686	Pending	1.21088213
## 97	28	17.803756	Pending	3.87204768
## 98	13	65.765156	Fail	3.37623783
## 99	9	5.604691	Pending	2.90812217
## 100	2	38.072899	Fail	0.34602729

	Transportation.modes	Routes	Costs
## 1	Road	Route B	187.7521
## 2	Road	Route B	503.0656
## 3	Air	Route C	141.9203
## 4	Rail	Route A	254.7762
## 5	Air	Route A	923.4406
## 6	Road	Route A	235.4612
## 7	Sea	Route A	134.3691
## 8	Road	Route C	802.0563
## 9	Sea	Route B	505.5571
## 10	Rail	Route B	995.9295
## 11	Road	Route B	806.1032
## 12	Air	Route A	126.7230
## 13	Road	Route B	402.9688
## 14	Road	Route B	547.2410

```
## 15      Air Route B 929.2353
## 16      Sea Route B 127.8618
## 17      Air Route A 865.5258
## 18      Air Route C 670.9344
## 19      Sea Route A 593.4803
## 20      Road Route C 477.3076
## 21      Air Route B 493.8712
## 22      Air Route C 523.3609
## 23      Rail Route C 205.5720
## 24      Rail Route A 196.3294
## 25      Air Route A 758.7248
## 26      Road Route B 458.5359
## 27      Rail Route A 617.8669
## 28      Sea Route B 762.4592
## 29      Air Route A 123.4370
## 30      Road Route B 764.9354
## 31      Road Route C 880.0810
## 32      Rail Route C 609.3792
## 33      Road Route A 761.1739
## 34      Sea Route A 371.2553
## 35      Road Route B 510.3580
## 36      Sea Route C 553.4205
## 37      Air Route C 403.8090
## 38      Sea Route A 183.9330
## 39      Air Route B 339.6729
## 40      Air Route B 653.6730
## 41      Road Route A 529.8087
## 42      Sea Route A 275.5244
## 43      Road Route A 635.6571
## 44      Air Route A 716.0441
## 45      Rail Route A 610.4533
## 46      Rail Route A 495.3057
## 47      Road Route B 380.4359
## 48      Rail Route A 581.6024
## 49      Rail Route B 768.6519
## 50      Rail Route A 336.8902
## 51      Rail Route B 496.2487
## 52      Road Route A 694.9823
## 53      Air Route C 602.8985
## 54      Air Route B 750.7378
## 55      Road Route B 814.0700
## 56      Sea Route B 323.0129
## 57      Air Route B 832.2108
## 58      Rail Route A 482.1912
## 59      Road Route B 110.3643
## 60      Air Route A 312.5743
## 61      Rail Route A 430.1691
## 62      Air Route A 164.3665
## 63      Sea Route C 320.8465
## 64      Sea Route A 687.2862
## 65      Air Route C 771.2251
## 66      Rail Route C 555.8591
```

```
## 67      Road Route A 393.8433
## 68      Sea Route C 169.2718
## 69      Rail Route A 299.7063
## 70      Air Route A 207.6632
## 71      Road Route C 183.2729
## 72      Road Route A 405.1671
## 73      Rail Route B 677.9446
## 74      Road Route A 866.4728
## 75      Rail Route A 341.5527
## 76      Air Route C 873.1296
## 77      Rail Route A 997.4135
## 78      Road Route B 852.5681
## 79      Sea Route C 323.5922
## 80      Air Route C 351.5042
## 81      Sea Route B 787.7799
## 82      Rail Route B 276.7783
## 83      Road Route C 589.9786
## 84      Road Route A 682.9710
## 85      Air Route B 465.4570
## 86      Road Route B 842.6868
## 87      Rail Route A 264.2549
## 88      Sea Route B 879.3592
## 89      Sea Route A 103.9162
## 90      Rail Route B 517.5000
## 91      Rail Route B 990.0785
## 92      Rail Route B 996.7783
## 93      Rail Route B 230.0928
## 94      Air Route A 823.5238
## 95      Rail Route B 846.6653
## 96      Air Route A 778.8642
## 97      Road Route A 188.7421
## 98      Road Route A 540.1324
## 99      Rail Route A 882.1989
## 100     Rail Route B 210.7430
```

```
head(vin,10)
```

```

##   Product.type SKU      Price Availability Number.of.products.sold
## 1    haircare  SKU0  69.808006        55            802
## 2    skincare  SKU1  14.843523        95            736
## 3    haircare  SKU2  11.319683        34              8
## 4    skincare  SKU3  61.163343        68            83
## 5    skincare  SKU4  4.805496        26            871
## 6    haircare  SKU5  1.699976        87            147
## 7    skincare  SKU6  4.078333        48            65
## 8    cosmetics SKU7  42.958384        59            426
## 9    cosmetics SKU8  68.717597        78            150
## 10   skincare  SKU9  64.015733        35            980

##   Revenue.generated Customer.demographics Stock.levels Lead.times
## 1     8661.997           Non-binary       58            7
## 2     7460.900           Female          53            30
## 3     9577.750           Unknown         1             10
## 4     7766.836           Non-binary       23            13
## 5     2686.505           Non-binary       5             3
## 6     2828.349           Non-binary       90            27
## 7     7823.477           Male            11            15
## 8     8496.104           Female          93            17
## 9     7517.363           Female          5             10
## 10    4971.146           Unknown         14            27

##   Order.quantities Shipping.times Shipping.carriers Shipping.costs
## 1          96            4       Carrier B  2.956572
## 2          37            2       Carrier A  9.716575
## 3          88            2       Carrier B  8.054479
## 4          59            6       Carrier C  1.729569
## 5          56            8       Carrier A  3.890548
## 6          66            3       Carrier B  4.444099
## 7          58            8       Carrier C  3.880763
## 8          11            1       Carrier B  2.348339
## 9          15            7       Carrier C  3.404734
## 10         83            1       Carrier A  7.166645

##   Supplier.name Location Lead.time Production.volumes Manufacturing.lead.time
## 1   Supplier 3    Mumbai      29          215                  29
## 2   Supplier 3    Mumbai      23          517                  30
## 3   Supplier 1    Mumbai      12          971                  27
## 4   Supplier 5    Kolkata     24          937                  18
## 5   Supplier 1    Delhi       5          414                  3
## 6   Supplier 4    Bangalore    10          104                 17
## 7   Supplier 3    Kolkata     14          314                 24
## 8   Supplier 4    Bangalore    22          564                  1
## 9   Supplier 4    Mumbai       13          769                  8
## 10  Supplier 2    Chennai     29          963                 23

##   Manufacturing.costs Inspection.results Defect.rates Transportation.modes
## 1        46.279879      Pending  0.2264104            Road
## 2        33.616769      Pending  4.8540680            Road
## 3        30.688019      Pending  4.5805926            Air
## 4        35.624741      Fail    4.7466486            Rail
## 5        92.065161      Fail    3.1455795            Air
## 6        56.766476      Fail    2.7791935            Road
## 7        1.085069      Pending  1.0009106            Sea

```

```

## 8      99.466109      Fail   0.3981772      Road
## 9     11.423027    Pending  2.7098627      Sea
## 10    47.957602    Pending  3.8446145     Rail
##      Routes   Costs
## 1  Route B 187.7521
## 2  Route B 503.0656
## 3  Route C 141.9203
## 4  Route A 254.7762
## 5  Route A 923.4406
## 6  Route A 235.4612
## 7  Route A 134.3691
## 8  Route C 802.0563
## 9  Route B 505.5571
## 10 Route B 995.9295

```

```

kad <- sqrt(vin$Order.quantities)
print(kad)

```

```

## [1] 9.797959 6.082763 9.380832 7.681146 7.483315 8.124038 7.615773 3.316625
## [9] 3.872983 9.110434 8.944272 7.745967 9.219544 6.928203 8.831761 8.306624
## [17] 8.831761 9.219544 6.782330 9.695360 8.246211 2.645751 7.937254 5.385165
## [25] 1.414214 7.211103 6.928203 7.874008 4.898979 8.185353 5.916080 6.633250
## [33] 8.000000 9.746794 4.582576 9.219544 5.291503 4.582576 9.380832 5.830952
## [41] 6.244998 6.164414 7.549834 9.219544 8.485281 7.211103 2.449490 7.141428
## [49] 3.000000 3.000000 9.055385 7.211103 3.316625 7.348469 7.810250 3.316625
## [57] 9.110434 7.141428 6.633250 5.099020 8.485281 6.000000 6.324555 3.162278
## [65] 8.660254 7.348469 4.358899 8.426150 7.615773 5.196152 4.690416 5.099020
## [73] 8.774964 8.124038 1.000000 7.483315 4.690416 7.549834 7.141428 4.472136
## [81] 6.403124 2.828427 8.485281 2.645751 8.944272 8.124038 4.690416 7.416198
## [89] 9.219544 5.196152 9.797959 9.219544 3.162278 8.124038 8.485281 5.099020
## [97] 5.656854 2.000000 5.196152 7.681146

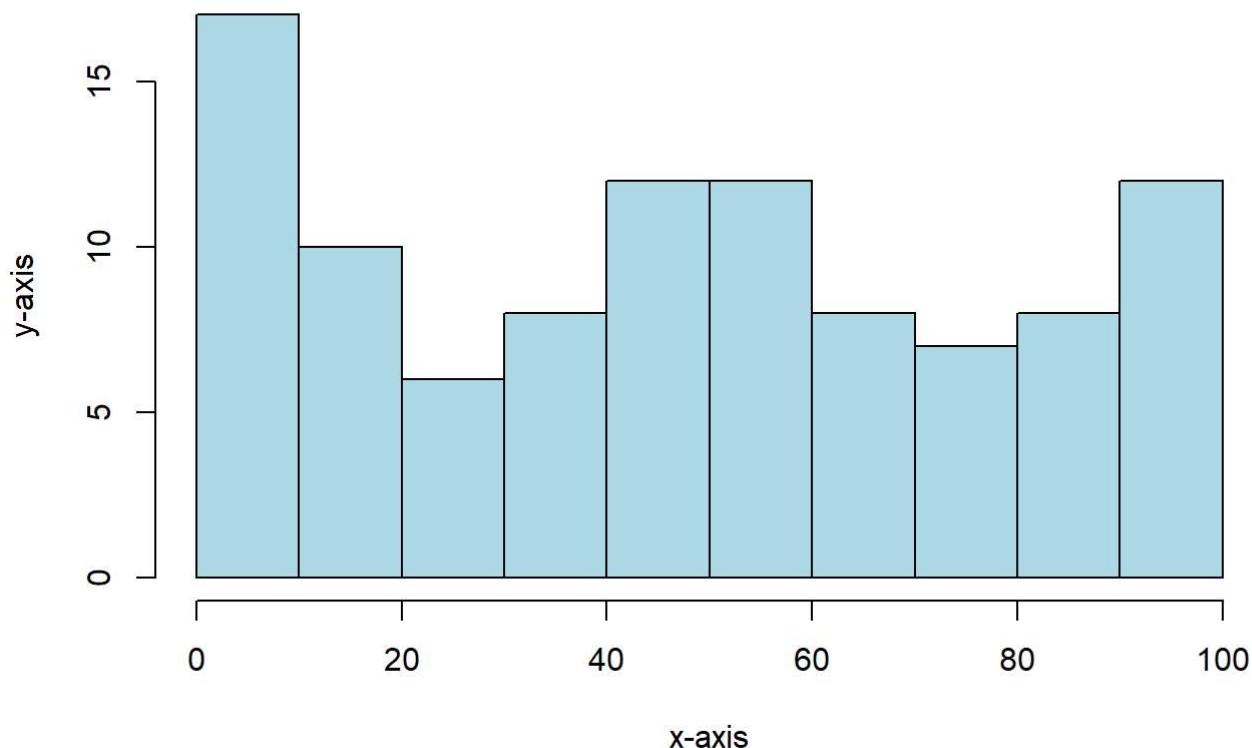
```

```

hist(vin$Stock.levels, main="plot of one quantitative variable", xlab = "x-axis", ylab = "y-axis", col = "light blue")

```

plot of one quantitative variable



```
plot(vin$Shipping.times,vin$Shipping.costs, main = "scatterplot of shipping time v/s shipping cost", xlab = "x-axis", ylab ="y-axis",pch =3, col="red")
```

scatterplot of shipping time v/s shipping cost