# Week3\_607

#### Heleine Fouda

2023-09-24

1. Using the 173 majors listed in fivethirty eight.com College Majors data set [https://fivethirtyeight.com/features/the-economic-guide-to-picking-a-college-major/], provide code that identifies the majors that contain either "DATA" or "STATISTICS"

## Loading the data

```
url <- "https://github.com/fivethirtyeight/data/blob/master/college-majors/recent-grads.csv?raw=true"
college_majors <- read.csv(url)
college_majors</pre>
```

```
Rank Major_code
##
## 1
          1
                   2419
          2
## 2
                   2416
## 3
          3
                   2415
## 4
          4
                   2417
## 5
          5
                   2405
          6
                   2418
          7
## 7
                   6202
## 8
          8
                   5001
## 9
          9
                   2414
## 10
         10
                   2408
                   2407
## 11
         11
         12
                   2401
## 12
## 13
         13
                   2404
## 14
         14
                   5008
## 15
         15
                   2409
## 16
         16
                   2402
## 17
         17
                   2412
## 18
         18
                   2400
## 19
         19
                   2403
## 20
         20
                   3201
## 21
         21
                   2102
## 22
         22
                   1104
## 23
         23
                   2502
                   2413
## 24
         24
## 25
         25
                   6212
## 26
         26
                   2406
## 27
         27
                   5601
```

##	28	28	6204
##	29	29	2499
##	30	30	5402
##	31	31	2410
##	32	32	2500
##	33	33	6099
##	34	34	2411
##	35	35	6107
##	36	36	6207
##	37	37	5501
##	38	38	6205
##	39	39	2503
##	40	40	5102
##	41	41	6201
##	42	42	3700
##	43	43	2100
##	44	44	5007
##	45	45	6105
##	46	46	2105
##	47	47	3702
##	48	48	3701
##	49	49	3607
##	50	50	5006
##	51	51	2501
##	52	52	6104
##	53	53	4005
##	54	54	2101
##	55	55	4006
##	56	56	2303
##	57	57	5505
##	58	58	6200
##	59	59	1401
##	60	60	6210
##	61	61	6108
##	62	62	3603
##	63	63	6299
##	64	64	1101
##	65	65	1100
##	66	66	2599
##	67	67	2504
##	68	68	3605
##	69	69	5599
##	70	70	6403
##	71	71	5205
##	72	72	1102
##	73	73	5000
##	74	74	3801
##	75	75	5003
##	76	76	5701
##	77	77	6203
##	78	78	6206
##	79	79	5506
##	80	80	5504
##	81	81	3606

##	82	82	2106
##		83	3601
	84	84	3602
	85	85	2107
	86	86	5004
	87	87	6209
	88	88	3202
	89	89	6199
	90	90	5401
	91	91	5005
	92	92	5206
	93 94	93	1301
	94 95	94 95	1901 5301
	96	96	6004
	90 97	90 97	1902
	98	98	5098
	99	99	1904
	100		1501
	101		2310
	102		3608
	103		5503
	104		4002
	105		6103
	106		2001
##	107	107	5901
##	108	108	1303
##	109	109	3611
##	110	110	4000
	111		5002
	112		1302
	113		1106
	114		2300
	115		6402
	116		2602
	117		4001
		118	2311
##	119	119	6110
##		120	2305
##		121	2301
## ##		122 123	6106 3699
##		123	3600
##		125	5507
##		126	1903
##		127	6109
##		128	6211
##		129	2313
##		130	2601
##		131	2399
##		132	4007
##		133	3604
##			2309
##			6100

```
## 136
        136
                   4801
## 137
        137
                   2314
## 138
                   3301
        138
## 139
                   2304
        139
## 140
        140
                   4101
## 141
        141
                   3401
## 142
        142
                   6005
## 143
                   5500
        143
## 144
        144
                   1105
## 145
        145
                   2308
## 146
        146
                   5200
## 147
        147
                   6002
## 148
                   2306
        148
## 149
                   6006
        149
## 150
        150
                   6000
## 151
        151
                   2901
## 152
        152
                   5404
## 153
        153
                   1103
## 154
        154
                   6003
                   2312
## 155
        155
## 156
        156
                   5299
## 157
        157
                   5403
## 158
                   3402
        158
## 159
        159
                   4901
## 160
                   6007
        160
## 161
        161
                   2201
## 162
        162
                   1199
## 163
        163
                   5502
## 164
        164
                   6102
## 165
                   2307
        165
## 166
        166
                   2603
## 167
        167
                   6001
## 168
                   3302
        168
## 169
        169
                   3609
## 170
        170
                   5201
## 171
        171
                   5202
## 172
        172
                   5203
## 173
       173
                   3501
##
                                                                       Major
                                                                             Total
## 1
                                                      PETROLEUM ENGINEERING
                                                                                2339
## 2
                                            MINING AND MINERAL ENGINEERING
                                                                                 756
## 3
                                                  METALLURGICAL ENGINEERING
                                                                                 856
## 4
                                NAVAL ARCHITECTURE AND MARINE ENGINEERING
                                                                                1258
## 5
                                                                               32260
                                                       CHEMICAL ENGINEERING
## 6
                                                        NUCLEAR ENGINEERING
                                                                                2573
## 7
                                                           ACTUARIAL SCIENCE
                                                                                3777
## 8
                                                 ASTRONOMY AND ASTROPHYSICS
                                                                                1792
## 9
                                                     MECHANICAL ENGINEERING
                                                                               91227
## 10
                                                     ELECTRICAL ENGINEERING
                                                                               81527
## 11
                                                       COMPUTER ENGINEERING
                                                                               41542
## 12
                                                      AEROSPACE ENGINEERING
                                                                               15058
## 13
                                                     BIOMEDICAL ENGINEERING
                                                                               14955
## 14
                                                          MATERIALS SCIENCE
                                                                                4279
## 15
                                 ENGINEERING MECHANICS PHYSICS AND SCIENCE
                                                                                4321
```

##		BIOLOGICAL ENGINEERING	8925
	17	INDUSTRIAL AND MANUFACTURING ENGINEERING	
##		GENERAL ENGINEERING	
##		ARCHITECTURAL ENGINEERING	2825
##		COURT REPORTING	1148
##		COMPUTER SCIENCE	
## ##		FOOD SCIENCE	NA 11565
	23	ELECTRICAL ENGINEERING TECHNOLOGY MATERIALS ENGINEERING AND MATERIALS SCIENCE	11565 2993
##		MANAGEMENT INFORMATION SYSTEMS AND STATISTICS	18713
##		CIVIL ENGINEERING	
##		CONSTRUCTION SERVICES	
##		OPERATIONS LOGISTICS AND E-COMMERCE	11732
##		MISCELLANEOUS ENGINEERING	9133
##		PUBLIC POLICY	5978
##		ENVIRONMENTAL ENGINEERING	4047
	32	ENGINEERING TECHNOLOGIES	3600
	33	MISCELLANEOUS FINE ARTS	3340
	34	GEOLOGICAL AND GEOPHYSICAL ENGINEERING	720
##		NURSING	
##		FINANCE	174506
	37	ECONOMICS	
##	38	BUSINESS ECONOMICS	13302
##	39	INDUSTRIAL PRODUCTION TECHNOLOGIES	4631
##	40	NUCLEAR, INDUSTRIAL RADIOLOGY, AND BIOLOGICAL TECHNOLOGIES	2116
##	41	ACCOUNTING	198633
##	42	MATHEMATICS	72397
##	43	COMPUTER AND INFORMATION SYSTEMS	36698
##	44	PHYSICS	32142
##	45	MEDICAL TECHNOLOGIES TECHNICIANS	15914
##	46	INFORMATION SCIENCES	11913
##	47	STATISTICS AND DECISION SCIENCE	6251
##	48	APPLIED MATHEMATICS	4939
##	49	PHARMACOLOGY	1762
##	50	OCEANOGRAPHY	2418
##		ENGINEERING AND INDUSTRIAL MANAGEMENT	2906
##	52	MEDICAL ASSISTING SERVICES	11123
	53	MATHEMATICS AND COMPUTER SCIENCE	609
	54	COMPUTER PROGRAMMING AND DATA PROCESSING	4168
	55	COGNITIVE SCIENCE AND BIOPSYCHOLOGY	3831
	56	SCHOOL STUDENT COUNSELING	818
	57 58	INTERNATIONAL RELATIONS	28187
##		GENERAL BUSINESS	
		ARCHITECTURE INTERNATIONAL BUSINESS	46420
## ##		PHARMACY PHARMACEUTICAL SCIENCES AND ADMINISTRATION	25894 23551
	62	PHARMACY PHARMACEUTICAL SCIENCES AND ADMINISTRATION MOLECULAR BIOLOGY	18300
	63	MISCELLANEOUS BUSINESS & MEDICAL ADMINISTRATION	17947
	64	AGRICULTURE PRODUCTION AND MANAGEMENT	14240
##		AGRICULTURE PRODUCTION AND MANAGEMENT GENERAL AGRICULTURE	10399
##		MISCELLANEOUS ENGINEERING TECHNOLOGIES	8804
	67	MECHANICAL ENGINEERING RELATED TECHNOLOGIES	4790
	68	GENETICS	3635
	69	MISCELLANEOUS SOCIAL SCIENCES	3283
тπ		MIDOLLEMINED BOOTAL BOILINGED	0200

шш	70	IMITTED OTATED HIGTORY	2070
##		UNITED STATES HISTORY INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY	3079 3014
##		AGRICULTURAL ECONOMICS	2439
##		PHYSICAL SCIENCES	1436
##		MILITARY TECHNOLOGIES	124
##		CHEMISTRY	66530
##		ELECTRICAL, MECHANICAL, AND PRECISION TECHNOLOGIES AND PRODUCTION	2435
##		BUSINESS MANAGEMENT AND ADMINISTRATION	
##		MARKETING AND MARKETING RESEARCH	
##		POLITICAL SCIENCE AND GOVERNMENT	
##		GEOGRAPHY	18480
##		MICROBIOLOGY	15232
##		COMPUTER ADMINISTRATION MANAGEMENT AND SECURITY	8066
##		BIOCHEMICAL SCIENCES	39107
##		BOTANY	1329
##	85	COMPUTER NETWORKING AND TELECOMMUNICATIONS	7613
##	86	GEOLOGY AND EARTH SCIENCE	10972
##	87	HUMAN RESOURCES AND PERSONNEL MANAGEMENT	24497
##	88	PRE-LAW AND LEGAL STUDIES	13528
##	89	MISCELLANEOUS HEALTH MEDICAL PROFESSIONS	13386
##	90	PUBLIC ADMINISTRATION	5629
##	91	GEOSCIENCES	1978
##	92	SOCIAL PSYCHOLOGY	1386
##	93	ENVIRONMENTAL SCIENCE	25965
##	94	COMMUNICATIONS	213996
##	95	CRIMINAL JUSTICE AND FIRE PROTECTION	
##		COMMERCIAL ART AND GRAPHIC DESIGN	
##		JOURNALISM	
##		MULTI-DISCIPLINARY OR GENERAL SCIENCE	62052
##		ADVERTISING AND PUBLIC RELATIONS	
	100	AREA ETHNIC AND CIVILIZATION STUDIES	31195
	101 102	SPECIAL NEEDS EDUCATION	28739 22060
	102	PHYSIOLOGY CRIMINOLOGY	
	103	NUTRITION SCIENCES	
	105	HEALTH AND MEDICAL ADMINISTRATIVE SERVICES	
	106	COMMUNICATION TECHNOLOGIES	18035
	107	TRANSPORTATION SCIENCES AND TECHNOLOGIES	15150
	108	NATURAL RESOURCES MANAGEMENT	13773
##	109	NEUROSCIENCE	13663
##	110	MULTI/INTERDISCIPLINARY STUDIES	12296
##	111	ATMOSPHERIC SCIENCES AND METEOROLOGY	4043
##	112	FORESTRY	3607
##	113	SOIL SCIENCE	685
	114	GENERAL EDUCATION	
##	115	HISTORY	141951
	116	FRENCH GERMAN LATIN AND OTHER COMMON FOREIGN LANGUAGE STUDIES	48246
	117	INTERCULTURAL AND INTERNATIONAL STUDIES	24650
	118	SOCIAL SCIENCE OR HISTORY TEACHER EDUCATION	20198
	119	COMMUNITY AND PUBLIC HEALTH	19735
	120	MATHEMATICS TEACHER EDUCATION	14237
	121	EDUCATIONAL ADMINISTRATION AND SUPERVISION	804
	122	HEALTH AND MEDICAL PREPARATORY PROGRAMS	12740
##	123	MISCELLANEOUS BIOLOGY	10706

	124			BIOLOGY	
	125			SOCIOLOGY	
	126			MASS MEDIA	52824
##	127			TREATMENT THERAPY PROFESSIONS	48491
##	128			HOSPITALITY MANAGEMENT	43647
##	129			LANGUAGE AND DRAMA EDUCATION	30471
##	130			LINGUISTICS AND COMPARATIVE LANGUAGE AND LITERATURE	16601
##	131			MISCELLANEOUS EDUCATION	10150
##	132			INTERDISCIPLINARY SOCIAL SCIENCES	9916
##	133			ECOLOGY	9154
##	134			SECONDARY TEACHER EDUCATION	17125
##	135			GENERAL MEDICAL AND HEALTH SERVICES	33599
##	136			PHILOSOPHY AND RELIGIOUS STUDIES	54814
##	137			ART AND MUSIC EDUCATION	34181
##	138			ENGLISH LANGUAGE AND LITERATURE	194673
##	139			ELEMENTARY EDUCATION	170862
##	140			PHYSICAL FITNESS PARKS RECREATION AND LEISURE	125074
##	141			LIBERAL ARTS	71369
##	142			FILM VIDEO AND PHOTOGRAPHIC ARTS	38761
##	143			GENERAL SOCIAL SCIENCES	12920
##	144			PLANT SCIENCE AND AGRONOMY	7416
##	145			SCIENCE AND COMPUTER TEACHER EDUCATION	6483
##	146			PSYCHOLOGY	393735
##	147			MUSIC	60633
##	148			PHYSICAL AND HEALTH EDUCATION TEACHING	28213
##	149			ART HISTORY AND CRITICISM	21030
##	150			FINE ARTS	74440
##	151			FAMILY AND CONSUMER SCIENCES	58001
##	152			SOCIAL WORK	53552
##	153			ANIMAL SCIENCES	21573
##	154			VISUAL AND PERFORMING ARTS	16250
##	155			TEACHER EDUCATION: MULTIPLE LEVELS	14443
##	156			MISCELLANEOUS PSYCHOLOGY	9628
##	157			HUMAN SERVICES AND COMMUNITY ORGANIZATION	9374
##	158			HUMANITIES	6652
##	159			THEOLOGY AND RELIGIOUS VOCATIONS	30207
##	160			STUDIO ARTS	16977
##	161			COSMETOLOGY SERVICES AND CULINARY ARTS	10510
##	162			MISCELLANEOUS AGRICULTURE	1488
##	163			ANTHROPOLOGY AND ARCHEOLOGY	38844
##	164			COMMUNICATION DISORDERS SCIENCES AND SERVICES	38279
##	165			EARLY CHILDHOOD EDUCATION	37589
##	166			OTHER FOREIGN LANGUAGES	11204
##	167			DRAMA AND THEATER ARTS	43249
##	168			COMPOSITION AND RHETORIC	18953
##	169			ZOOLOGY	8409
	170			EDUCATIONAL PSYCHOLOGY	2854
	171			CLINICAL PSYCHOLOGY	2838
##	172			COUNSELING PSYCHOLOGY	4626
##	173			LIBRARY SCIENCE	1098
##		Men	Women	Major_category ShareWomen Sampl	_
##		2057	282	Engineering 0.12056434	36
##	2	679	77	Engineering 0.10185185	7
##	3	725	131	Engineering 0.15303738	3

##	4	1123	135	Engineering	0.10731320	16
##	5	21239	11021	Engineering		289
##	6	2200	373	Engineering		17
##	7	2110	1667	Business	0.44135557	51
##	8	832	960	Physical Sciences	0.53571429	10
##	9	80320	10907	Engineering		1029
##	10	65511	16016	Engineering		631
##	11	33258	8284	Engineering		399
##	12	12953	2105	Engineering		147
##	13	8407	6548	Engineering		79
##	14	2949	1330	Engineering		22
##	15	3526	795	Engineering	0.18398519	30
##	16	6062	2863	Engineering	0.32078431	55
##	17	12453	6515	Engineering	0.34347322	183
##	18	45683	15469	Engineering	0.25295984	425
##	19	1835	990	Engineering		26
##	20	877	271	Law & Public Policy		14
##	21	99743	28576	Computers & Mathematics		1196
##	22	NA	NA	Agriculture & Natural Resources	NA	36
##	23	8181	3384	Engineering	0.29260700	97
##	24	2020	973	Engineering		22
##	25	13496	5217	5	0.27879015	278
##	26	41081	12072	Engineering	0.22711794	565
##	27	16820	1678	Industrial Arts & Consumer Services		295
##	28	7921	3811		0.32483805	156
##	29	7398	1735	Engineering	0.18997044	118
##	30	2639	3339	Law & Public Policy		55
##	31	2662	1385	Engineering		26
##	32	2695	905	Engineering		39
##	33	1970	1370		0.41017964	30
##	34	488	232	Engineering	0.3222222	5
##	35	21773	187621		0.89601899	2554
##	36	115030	59476	Business	0.34082496	2189
##	37	89749	49498	Social Science	0.35546906	1322
##	38	7575	5727	Business	0.43053676	199
##	39	3477	1154	Engineering	0.24919024	73
##	40	528	1588	Physical Sciences	0.75047259	31
##	41	94519	104114	Business	0.52415258	2042
##	42	39956	32441	Computers & Mathematics	0.44809868	541
##	43	27392	9306	Computers & Mathematics	0.25358330	425
##	44	23080	9062	Physical Sciences	0.28193641	142
##	45	3916	11998	Health	0.75392736	190
##	46	9005	2908	Computers & Mathematics	0.24410308	158
##	47	2960	3291	Computers & Mathematics	0.52647576	37
##	48	2794	2145	Computers & Mathematics	0.43429844	45
##	49	515	1247	Biology & Life Science	0.70771850	3
##	50	752	1666	Physical Sciences	0.68899917	36
##	51	2400	506	Engineering	0.17412251	29
##	52	803	10320	Health	0.92780725	67
##	53	500	109	Computers & Mathematics	0.17898194	7
##	54	3046	1122	Computers & Mathematics		43
##	55	1667	2164	Biology & Life Science	0.56486557	25
##	56	119	699	Education	0.85452323	4
##	57	10345	17842	Social Science	0.63298684	219

```
2380
## 58
       132238 102352
                                                   Business 0.43630163
##
  59
        25463
               20957
                                                                                 362
                                                Engineering 0.45146489
               15270
##
   60
        10624
                                                   Business 0.58971190
                                                                                 260
                14854
                                                                                  38
##
  61
         8697
                                                     Health 0.63071632
##
   62
         7426
                10874
                                    Biology & Life Science 0.59420765
                                                                                  90
  63
                 7662
##
        10285
                                                   Business 0.42692372
                                                                                 244
  64
                 4582
                          Agriculture & Natural Resources 0.32176966
##
         9658
                                                                                 273
## 65
                 4346
                          Agriculture & Natural Resources 0.41792480
         6053
                                                                                 158
##
   66
         7043
                 1761
                                                Engineering 0.20002272
                                                                                 125
## 67
         4419
                  371
                                                Engineering 0.07745303
                                                                                  71
##
  68
         1761
                 1874
                                    Biology & Life Science 0.51554333
                                                                                  11
##
  69
         1499
                 1784
                                             Social Science 0.54340542
                                                                                  28
##
   70
         1756
                 1323
                                 Humanities & Liberal Arts 0.42968496
                                                                                  22
## 71
                 1939
                                  Psychology & Social Work 0.64333112
         1075
                                                                                  24
## 72
         1749
                  690
                          Agriculture & Natural Resources 0.28290283
                                                                                  44
## 73
          894
                  542
                                         Physical Sciences 0.37743733
                                                                                  10
##
  74
                    O Industrial Arts & Consumer Services 0.00000000
          124
                                                                                   4
##
  75
        32923
               33607
                                         Physical Sciences 0.50514054
                                                                                 353
                     Industrial Arts & Consumer Services 0.23244353
##
         1869
                  566
                                                                                  37
  76
##
   77
       173809 156118
                                                   Business 0.47318952
                                                                                4212
##
  78
        78857 126354
                                                   Business 0.61572723
                                                                                2684
##
  79
        93880
               88741
                                             Social Science 0.48592988
                                                                                1387
## 80
        11404
                 7076
                                             Social Science 0.38290043
                                                                                 179
  81
         6383
                 8849
                                    Biology & Life Science 0.58094800
##
                                                                                  62
## 82
                 1459
                                                                                 103
         6607
                                   Computers & Mathematics 0.18088272
##
   83
        18951
                20156
                                    Biology & Life Science 0.51540645
                                                                                 174
##
  84
          626
                  703
                                    Biology & Life Science 0.52896915
                                                                                   9
                 2322
                                                                                  97
##
   85
         5291
                                   Computers & Mathematics 0.30500460
##
  86
                 5159
                                         Physical Sciences 0.47019687
                                                                                  78
         5813
##
  87
         6184
               18313
                                                   Business 0.74756093
                                                                                 264
## 88
         4435
                 9093
                                       Law & Public Policy 0.67216144
                                                                                  92
##
   89
         1589
                11797
                                                     Health 0.88129389
                                                                                  81
##
  90
         2947
                 2682
                                       Law & Public Policy 0.47646118
                                                                                  46
##
                 1169
                                         Physical Sciences 0.59100101
  91
          809
                                                                                  18
##
   92
          413
                  973
                                  Psychology & Social Work 0.70202020
                                                                                   8
##
  93
        10787
               15178
                                    Biology & Life Science 0.58455613
                                                                                 225
## 94
        70619 143377
                               Communications & Journalism 0.66999851
                                                                                2394
## 95
        80231
               72593
                                       Law & Public Policy 0.47501047
                                                                                1728
##
   96
        32041
               71439
                                                       Arts 0.69036529
                                                                                1186
##
  97
        23736
               48883
                               Communications & Journalism 0.67314339
                                                                                 843
##
  98
        27015
               35037
                                         Physical Sciences 0.56463933
                                                                                 427
## 99
        12862
               40300
                              Communications & Journalism 0.75806027
                                                                                 681
                                 Humanities & Liberal Arts 0.71985895
##
  100
         8739
               22456
                                                                                 249
## 101
         2682
               26057
                                                  Education 0.90667734
                                                                                 246
         8422
               13638
## 102
                                    Biology & Life Science 0.61822303
                                                                                  99
## 103
        10031
                 9848
                                             Social Science 0.49539715
                                                                                 214
## 104
         2563
               16346
                                                     Health 0.86445608
                                                                                 118
## 105
                13843
         4266
                                                     Health 0.76442653
                                                                                 184
                                   Computers & Mathematics 0.36617688
## 106
        11431
                 6604
                                                                                 208
##
  107
        13257
                 1893
                      Industrial Arts & Consumer Services 0.12495049
                                                                                 180
## 108
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## 110
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## 111
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##
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## 117
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## 121
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## 122
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   124 111762 168947
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## 132
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##
   139
        13029 157833
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##
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##
  140
        62181
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## 142
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##
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                                                                                 113
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  144
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                                                                                  59
##
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                                  Psychology & Social Work 0.77993320
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##
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## 163
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## 164
         1225
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## 165
         1167
               36422
                                                  Education 0.96895368
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	168		11931		nities & Liberal Arts	
	169	3050	5359		lology & Life Science	
	170	522	2332	•	chology & Social Work	
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	172	931	3695	Psyc	chology & Social Work	
	173	134	964			0.87795993
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	3	648	558	133	340	16
	4	758	1069	150	692	40
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##	6	1857	2038	264	1449	400
	7	2912	2924	296	2482	308
##	8	1526	1085	553	827	33
##		76442	71298	13101	54639	4650
##	10	61928	55450	12695	41413	3895
##	11	32506	30315	5146	23621	2275
##	12	11391	11106	2724	8790	794
	13	10047	9017	2694	5986	1019
##	14	3307	2751	878	1967	78
	15	3608	2999	811	2004	23
##	16	6170	5455	1983	3413	589
##	17	15604	14879	2243	11326	699
##	18	44931	41235	7199	33540	2859
##	19	2575	2277	343	1848	170
##	20	930	808	223	808	11
##	21	102087	91485	18726	70932	6884
##	22	3149	2558	1121	1735	338
##	23	8587	7530	1873	5681	824
##	24	2449	1658	1040	1151	70
##	25	16413	15141	2420	13017	1015
##	26	43041	38302	10080	29196	3270
	27	16318	15690	1751	12313	1042
##	28	10027	9639	1183	7724	504
##		7428	6811	1662	5476	597
##	30	4547	4163	1306	2776	670
##		2983	2384	930	1951	308
	32	2799	2257	689	1723	163
##		2914	2049	1067	1200	286
##		604	524	126	396	49
##	35	180903	151191	40818	122817	8497
##	36	145696	137921	21463	108595	9413
##	37	104117	96567	25325	70740	11452
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##	39	4428	3988	597	3242	129
##	40	1778	1392	579	1115	137
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##	42	58118	46399	18079	33738	2884
##	43	28459	26348	4332	21130	2934
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##	45	13150	11510	2665	9005	505

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##		9881	9105	1468	7378	639
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	56	730	595	135	545	88
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	108	0.066619195	35000		42000	4333	5808
	109	0.048481675	35000		44000	5605	2301
	110	0.070860927	35000		44000	5176	3903
	111	0.022228555	35000		50000	1808	1317
	112	0.096725743	35000		48000	1096	1692
	113	0.000000000	35000		44000	355	144
##	114	0.057359929	34000		41000	82007	31112
## ##	115 116	0.095666912 0.075566386	34000 34000		47000	35336	54569
##	117	0.073566366	34000		45000 45000	15051 4956	18193 10343
##	117	0.054082941	34000		42000	10928	5561
##	119	0.112144387	34000		45000	5225	7385
	120	0.016202835	34000		40000	10699	1977
	121	0.000000000	34000		35000	346	206
	122	0.069779712	33500		40000	3051	3539
##	123	0.058545455	33500		48000	4253	2722
	124	0.070724732	33400		45000	88232	81109
##	125	0.084951001	33000		44000	29051	48899
	126	0.089836827	33000		45000	12855	25297
	127	0.059821207	33000		41000	22215	14616
	128	0.061169193	33000		42000	2325	23341
	129	0.050306435	33000		40000	17985	6824
	130	0.104435710	33000		40000	4122	5695
##	131	0.059211951	33000	30000	45000	5284	2438
##	132	0.092305816	33000	24000	40000	2630	3906
##	133	0.054475193	33000	23000	42000	2856	4159
##	134	0.052228980	32500	25000	38000	10304	3967
##	135	0.082101621	32400	25000	45000	9364	12889
##	136	0.096051684	32200	23000	47100	14444	20313
##	137	0.038637747	32100	25000	40000	20821	8260
	138	0.087723590	32000		41000	57690	71827
	139	0.046585715	32000		38000	108085	36972
	140	0.051467273	32000		43000	27581	63946
##	141	0.078267592	32000	25000	42000	18565	28558

##	142	0.105772240	32000	22000	42000	7368	20721
	143	0.103474215		27000	50000	3602	4778
	144	0.045454545	32000		40000	2089	3545
	145	0.047263682	32000		39000	4214	1106
	146	0.083810867	31500		41000	125148	141860
	147	0.075959674	31000		42000	13752	28786
	148	0.074667496	31000		40000	12777	9328
	149	0.060298284	31000		40000	5139	9738
	150	0.084186296	30500		41000	20792	32725
	151	0.067128194	30000		40000	20985	20133
	152	0.068827920	30000		35000	27449	14416
	153	0.050862499	30000		40000	5443	9571
	154	0.102197419	30000		40000	3849	7635
	155	0.036545830	30000		37000	10766	1949
	156	0.051907830	30000		40000	2960	3948
	157	0.037819026	30000		35000	2878	4595
	158	0.068584071	30000		49000	1168	3354
	159	0.062628297	29000		38000	9927	12037
	160	0.089552239	29000		38300	3948	8707
	161	0.055676856	29000		36000	563	7384
	162	0.059766764	29000		42100	483	626
	163	0.102791571	28000		38000	9805	16693
	164	0.047584000	28000		40000	19957	9404
	165	0.040104981	28000		35000	23515	7705
	166	0.107115726	27500		38000	2326	3703
	167	0.077541130	27000	19200	35000	6994	25313
	168	0.081742207	27000	20000	35000	4855	8100
	169	0.046320280	26000	20000	39000	2771	2947
##	170	0.065112187	25000	24000	34000	1488	615
##	171	0.149048198	25000	25000	40000	986	870
##	172	0.053620646	23400	19200	26000	2403	1245
##	173	0.104945718	22000	20000	22000	288	338
##		Low_wage_jobs					
##	1	193					
##	2	50					
##	3	0					
##	4	0					
##	5	972					
##	6	244					
##	7	259					
##	8	220					
##	9	3253					
##	10	3170					
##	11	980					
##	12	372					
##	13	789					
##	14	81					
##	15	263					
##	16	524					
##	17	640					
##	18	3192					
##	19	137					
##	20	144					
##	21	5144					

##	22	485
##	23	696
##	24	70
##	25	708
##	26	2899
##	27	703
##	28	285
##	29	365
##	30	340
##	31	260
##	32	142
##	33	755
##	34	49
##	35	6193
##	36	9910
##	37	10653
##	38	1284
##	39 40	480 124
## ##	41	10886
##	42	4569
##	43	1672
##	44	1823
##	45	1002
##	46	608
##	47	343
##	48	357
##	49	93
##	50	186
##	51	245
##	52	1270
##	53	25
##	54	263
##	55	135
##	56	0
##	57	2499
##	58	27320
##	59	4221
##	60	3046
##	61	1121
##	62	1168
##	63	1758
##	64	1362
##	65	839
##	66	386
##	67	406
##	68	201
##	69	573
##	70	302
##	71	272
##	72	94
##	73	269
##	74	0
##	75	4288

##	76	81
##	77	32395
##	78	27968
##	79	19803
##	80	1905
##	81	1246
##	82	308
##	83	3012
##	84	56
##	85	352
##	86	959
##	87	1906
##	88	1336
##	89	1422
##	90	496
##	91	221
##	92	37
##	93	3175
##	94	27440
##	95	18404
##	96	14839
##	97	8512
##	98	5751
##	99	7214
##	100	3677
##	101	1179
##	102	2237
##	103	1895
##	104	2449
##	105	1391
##	106	2495
##	107	557
##	108	1405
##	109	902
##	110	1061
##	111	237
##	112	327
##	113	0
##	114	11443
##	115	16839
##	116	5267
##	117	3168
##	118	1806
##	119	1854
##	120	786
##	121	111
##	122	1159
##	123	459
##	124	28339
##	125	13748
##	126	6429
##	127	4468
##	128	9063
##	129	2819

```
2085
## 130
## 131
                 657
## 132
                 1470
## 133
                 976
## 134
                 1385
## 135
                 3816
## 136
                 8051
## 137
                 2767
## 138
                26503
## 139
                11502
## 140
                16838
## 141
                 9030
## 142
                 5862
## 143
                 1634
## 144
                 1231
## 145
                  591
## 146
                48207
                 9286
## 147
## 148
                 2042
## 149
                 3426
## 150
                11880
## 151
                 5248
## 152
                 4344
## 153
                 2125
## 154
                 2840
## 155
                 722
## 156
                 1650
## 157
                 724
## 158
                 1141
## 159
                 3304
## 160
                 3586
## 161
                 3163
## 162
                   31
## 163
                 6866
## 164
                 5125
## 165
                 2868
## 166
                 1115
## 167
                11068
## 168
                 3466
## 169
                  743
## 170
                   82
## 171
                  622
## 172
                  308
## 173
                  192
```

# Finding majors containing "DATA" OR "STATISTICS"

```
library(stringr)

college_majors <- read.csv(url)
matching_majors <- str_detect(college_majors, pattern = "DATA | STATISTICS")

## Warning in stri_detect_regex(string, pattern, negate = negate, opts_regex = ## opts(pattern)): argument is not an atomic vector; coercing</pre>
```

```
print(matching_majors)

## [1] FALSE FALSE TRUE FALSE Str_subset(college_majors$Major, pattern = "DATA | STATISTICS")

## [1] "MANAGEMENT INFORMATION SYSTEMS AND STATISTICS"

## [2] "COMPUTER PROGRAMMING AND DATA PROCESSING"
```

### 2. Write code that transforms the data

## original vector

```
fruits <- c("bell pepper", "bilberry", "blackberry", "blood orange", "blueberry", "cantaloupe", "chili</pre>
```

#### Transformed vector

```
fruits_new <- c(fruits)
print(fruits_new)

## [1] "bell pepper" "bilberry" "blackberry" "blood orange" "blueberry"
## [6] "cantaloupe" "chili pepper" "cloudberry" "elderberry" "lime"
## [11] "lychee" "mulberry" "olive" "salal berry"</pre>
```

# 3. Describe, in words, what these expressions will match:

- (.)\1\1 will match a string containing three consecutive identical characters. For example, it would match "eee" or "333."
- "(.)(.) $\2\1$ " will match a string that consists of two pairs of identical characters separated by a space. For example, it would match "i i," "7 7," or "y y," where the same character is repeated in each pair and separated by a space.
- (..) $\$ 1 will match a string containing two consecutive pairs of identical characters. For example, it would match "eeff" or "7799".
- "(.).\1.\1" will match a string that starts with three groups of characters separated by spaces, followed by any number of other characters, and ends with the characters from the three groups in reverse order. For example, it would match "a b c 123 cba" or "x y z 456 zyx," where the first three groups of characters are followed by any number of other characters and then followed by the same characters in reverse order.
- "(.)(.)(.).\* $\3\2\1$ " This regular expression is the same as"(.). $\1$ ." but without the escaped backslashes. It will also match strings that starts with three groups of characters separated by spaces, followed by any number of other characters, and ends with the characters from the three groups in reverse order
- #4 Construct regular expressions to match words that:

#### Start and end with the same character:

```
str_view("level", "\\b(\\w)(\\w*)\\1\\b")
## [1] | <level>
```

Contain a repeated pair of letters (e.g. "church" contains "ch" repeated twice.)

```
str_view("church", "\\b\\w*(\\w{2})\\w*\\1\\w*\\b")
```

## [1] | <church>

Contain one letter repeated in at least three places (e.g."eleven" contains three "e"s.)

```
str_view("Mississippi", "\\b(\\w*([a-zA-Z])\\w*\\2\\w*)\\b"
)
```

## [1] | <Mississippi>