

# junming\_intro

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## Introduction

This document contains an explanatory sketch of what we have done so far and what we would like to do.

The first dataset in question is the ONET database on occupation skills, work activities, knowledge domains, abilities, and work styles. Each occupation contains 179 metrics for the five domains, each originally on a scale from 1-6, but I have rescaled them linearly to lie between 0 and 1. These data primarily come from surveys and direct observation and are each associated with a standard error derived from the correspondance between observers. For now, these standard errors are not used, but they could be going forward. There are 424 occupations with 179 metrics, resulting in a matrix with those dimensions.

The second data is the current population survey (CPS) yearly economic supplement. This survey asks each participant if they have moved occupations in the previous year, and if so, what occupation they currently and previously held. We aim to use these data to track movement between occupations with the goal of describing how rigid the labor market is. This data is key to checking any class structures informed by the ONET data (or any other source of class structure data). Over a 30-year period, there are about 1,460,000 data points, of which about 100,000 moved jobs in the previous year. For these job-movers, we have supplementary information such as income, basic demographic data, education data, etc.

The two datasets can be merged (though imperfectly at this point) since CPS codes do not perfectly correspond with ONET codes. That's something we're working on separately. For now, about 90% of the data is mergeable, and this is what we have used in analyses thus far.

The preliminary goal is to use a data-driven method to create class structures that describe the suite of occupations in the CPS data. There have been few attempts to do this thus far. One of our colleagues, Siwei Cheng at NYU, has just submitted a paper that exclusively uses the CPS data in a network analysis to track flows between occupations so as to describe class structure. An alternative less-data driven attempt to describe class structure is detailed by Weeden and Grusky.

## Previous Work

A quick first pass has been done using the the ONET data only to create some categorical groupings. No CPS data is used in this model. Instead, the matrix of jobs and skills, activities, abilities, knowledge, and

styles is used with a k-means clustering algorithm to create K groupings. Due to the high multicollinearity between the many variables in the ONET database, the skills are first reduced to 25 principle components before being fed into the kmeans model. The kmeans model is run with  $k = 120, 67, 9$  and  $4$  in order to reflect some different, established class aggregation schemes. (120 and 67 refer to microclass schemes), 9 to mesoclass schemes, and 4 to macroclass (Erikson-Goldthorpe) schemes.

The below graph shows how an ONET-based class system captures closure in the class system with movements between occupations in the CPS data used to display performance of the ONET-based class system.

**Figure 1**

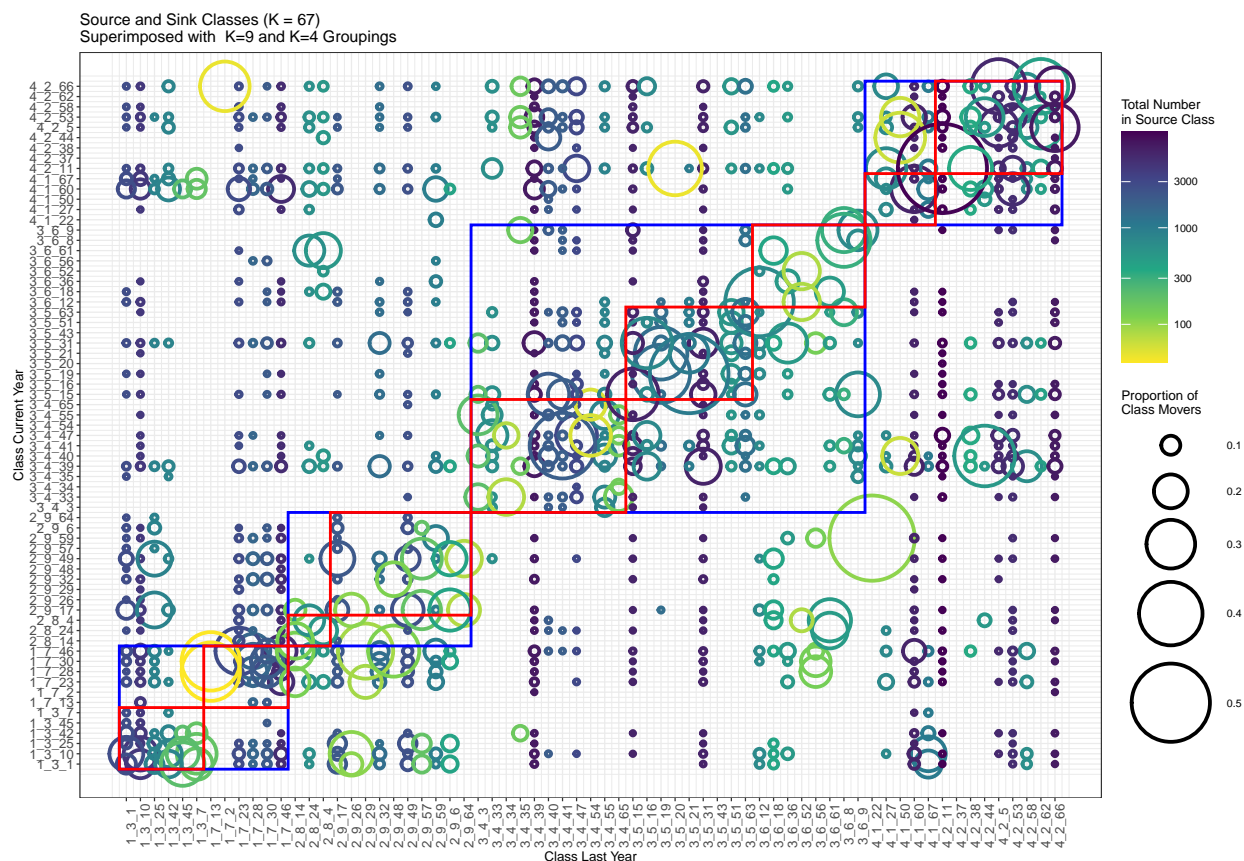
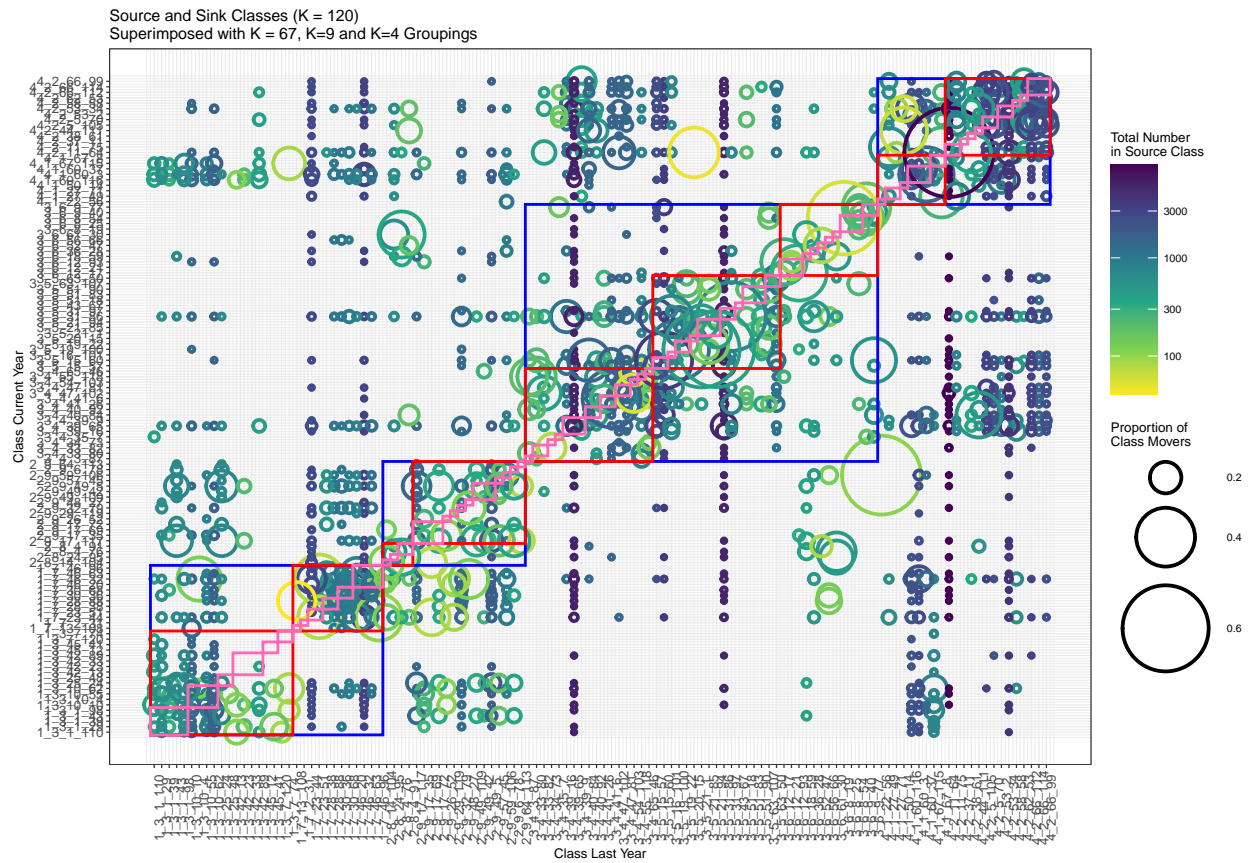


Figure 2



## Table 1

We can also compare how this system compares to the traditional micro-, meso-, and macro-class schemes. The below table shows how well each classification scheme tracks movements between classes. The numbers in each cell are the % of job movers who stay in the same class when they move jobs.

Importantly, the microclass performance is about even between the naive and data-driven models. Unfortunately, the aggregations into meso- and macro-classes is less good. However, we believe that using CPS data to inform the model could improve these statistics. I see away to do that with my kmeans clustering model, but Prof. Xie and I agree that we may as well implement a more flexible model sooner than later.

Thus, our goal is to optimize performance using the metrics below (or similar metrics) such that a skills-based model is able to classify occupations into a class structure that outperforms a naive or qualitative method of class structure like that used in previous research.

A critical component of the model must be that the classes nest (i.e.  $K = 67$  nests into  $k = 9$  nests into  $k = 4$ ). That said, the specific  $K$ s are up to our choosing, and I would even like to have the choice of  $K$  be data driven. Siwei achieved this with her method, and with her permission I can share her paper in progress with you. However, as degrees of freedom change (as  $K$  changes), obviously our ability to compare to traditional class systems is limited, since that complicates our comparison metrics.

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	Method	Macro (4)	Meso (9)	Micro (67)
1	Nested ONET-Based	0.56	0.41	0.15
2	Traditional	0.70	0.44	0.16

## Table 2

Below, you'll find what occupatioesn end up in what classes based on our ONET-based method.

	Title	Class_120	Class_67	Class_9	Class_4
1	Molders and molding machine se	1_3_10_55	1_3_10	1_3	1
2	Welding, soldering, and brazin	1_3_10_55	1_3_10	1_3	1
3	Sawing machine setters, operat	1_3_10_55	1_3_10	1_3	1
4	Helpers-production workers	1_3_10_55	1_3_10	1_3	1
5	Plating and coating machine se	1_3_10_4	1_3_10	1_3	1
6	Cleaning, washing, and metal p	1_3_10_4	1_3_10	1_3	1
7	Machine feeders and offbearers	1_3_10_4	1_3_10	1_3	1
8	Metal furnace and kiln operato	1_3_10_62	1_3_10	1_3	1
9	Metalworkers and plastic worke	1_3_10_62	1_3_10	1_3	1
10	Furnace, kiln, oven, drier, an	1_3_10_62	1_3_10	1_3	1
11	Cementing and gluing machine o	1_3_10_62	1_3_10	1_3	1
12	Paper goods machine setters, o	1_3_10_62	1_3_10	1_3	1
13	Tire builders	1_3_10_62	1_3_10	1_3	1
14	Production workers, including	1_3_10_62	1_3_10	1_3	1
15	Food and tobacco roasting, bak	1_3_10_10	1_3_10	1_3	1
16	Food batchmakers	1_3_10_10	1_3_10	1_3	1
17	Food cooking machine operators	1_3_10_10	1_3_10	1_3	1
18	Cutting workers	1_3_10_10	1_3_10	1_3	1
19	Inspectors, testers, sorters,	1_3_10_10	1_3_10	1_3	1
20	Aircraft structure, surfaces,	1_3_1_110	1_3_1	1_3	1
21	Electrical, electronics, and e	1_3_1_110	1_3_1	1_3	1
22	Engine and other machine assem	1_3_1_110	1_3_1	1_3	1
23	Structural metal fabricators a	1_3_1_110	1_3_1	1_3	1
24	Cutting, punching, and press m	1_3_1_39	1_3_1	1_3	1
25	Cabinetmakers and bench carpen	1_3_1_39	1_3_1	1_3	1
26	Woodworking machine setters, o	1_3_1_39	1_3_1	1_3	1
27	Industrial and refractory mach	1_3_1_43	1_3_1	1_3	1
28	Maintenance workers, machinery	1_3_1_43	1_3_1	1_3	1
29	Rolling machine setters, opera	1_3_1_29	1_3_1	1_3	1
30	Grinding, lapping, polishing,	1_3_1_29	1_3_1	1_3	1
31	Machinists	1_3_1_29	1_3_1	1_3	1
32	Tool grinders, filers, and sha	1_3_1_29	1_3_1	1_3	1
33	Extruding and drawing machine	1_3_1_98	1_3_1	1_3	1
34	Miscellaneous textile, apparel	1_3_1_98	1_3_1	1_3	1
35	Crushing, grinding, polishing,	1_3_1_98	1_3_1	1_3	1
36	Extruding, forming, pressing,	1_3_1_98	1_3_1	1_3	1
37	Packaging and filling machine	1_3_1_98	1_3_1	1_3	1
38	Upholsterers	1_3_7_120	1_3_7	1_3	1
39	Furniture finishers	1_3_7_120	1_3_7	1_3	1
40	Textile cutting machine setter	1_3_7_74	1_3_7	1_3	1
41	Textile winding, twisting, and	1_3_7_74	1_3_7	1_3	1
42	Automotive body and related re	1_3_25_24	1_3_25	1_3	1
43	Automotive glass installers an	1_3_25_24	1_3_25	1_3	1
44	Heavy vehicle and mobile equip	1_3_25_24	1_3_25	1_3	1
45	Small engine mechanics	1_3_25_24	1_3_25	1_3	1
46	Miscellaneous vehicle and mobi	1_3_25_24	1_3_25	1_3	1
47	Control and valve installers a	1_3_25_24	1_3_25	1_3	1
48	Etchers and engravers	1_3_25_48	1_3_25	1_3	1
49	Molders, shapers, and casters,	1_3_25_48	1_3_25	1_3	1
50	Office machine operators, exce	1_3_42_89	1_3_42	1_3	1
51	Bakers	1_3_42_89	1_3_42	1_3	1

	Title	Class_120	Class_67	Class_9	Class_4
1	Office machine operators, exce	1_3_42_89	1_3_42	1_3	1
2	Bakers	1_3_42_89	1_3_42	1_3	1
3	Photographic process workers a	1_3_42_89	1_3_42	1_3	1
4	Precision instrument and equip	1_3_42_23	1_3_42	1_3	1
5	Jewelers and precious stone an	1_3_42_23	1_3_42	1_3	1
6	Medical, dental, and ophthalmi	1_3_42_23	1_3_42	1_3	1
7	Prepress technicians and worke	1_3_42_33	1_3_42	1_3	1
8	Tailors, dressmakers, and sewe	1_3_42_13	1_3_42	1_3	1
9	Lathe and turning machine tool	1_3_45_12	1_3_45	1_3	1
10	Tool and die makers	1_3_45_41	1_3_45	1_3	1
11	Miscellaneous woodworkers, inc	1_3_45_41	1_3_45	1_3	1
12	Grounds maintenance workers	1_7_46_32	1_7_46	1_7	1
13	Rail-track laying and maintena	1_7_46_32	1_7_46	1_7	1
14	Other extraction workers, incl	1_7_46_32	1_7_46	1_7	1
15	Laborers and freight, stock, a	1_7_46_32	1_7_46	1_7	1
16	Construction equipment operato	1_7_46_20	1_7_46	1_7	1
17	Service station attendants	1_7_46_20	1_7_46	1_7	1
18	Crane and tower operators	1_7_46_20	1_7_46	1_7	1
19	Hoist and winch operators, and	1_7_46_20	1_7_46	1_7	1
20	Pumping station operators	1_7_46_20	1_7_46	1_7	1
21	Dredge, excavating, and loadin	1_7_46_96	1_7_46	1_7	1
22	Construction laborers	1_7_46_63	1_7_46	1_7	1
23	Paving, surfacing, and tamping	1_7_46_63	1_7_46	1_7	1
24	Highway maintenance workers	1_7_46_63	1_7_46	1_7	1
25	Cement masons, concrete finish	1_7_28_88	1_7_28	1_7	1
26	Drywall installers, ceiling ti	1_7_28_88	1_7_28	1_7	1
27	Glaziers	1_7_28_88	1_7_28	1_7	1
28	Painters, construction and mai	1_7_28_88	1_7_28	1_7	1
29	Helpers, construction trades	1_7_28_88	1_7_28	1_7	1
30	Brickmasons, blockmasons, and	1_7_28_38	1_7_28	1_7	1
31	Carpet, floor, and tile instal	1_7_28_38	1_7_28	1_7	1
32	Fence erectors	1_7_28_38	1_7_28	1_7	1
33	Miscellaneous construction and	1_7_28_38	1_7_28	1_7	1
34	Coin, vending, and amusement m	1_7_23_44	1_7_23	1_7	1
35	Driver/sales workers and truck	1_7_23_44	1_7_23	1_7	1
36	Industrial truck and tractor o	1_7_23_44	1_7_23	1_7	1
37	Refuse and recyclable material	1_7_23_51	1_7_23	1_7	1
38	Pipelayers, plumbers, pipefitt	1_7_30_36	1_7_30	1_7	1
39	Roofers	1_7_30_36	1_7_30	1_7	1
40	Sheet metal workers	1_7_30_36	1_7_30	1_7	1
41	Carpenters	1_7_30_68	1_7_30	1_7	1
42	Insulation workers	1_7_30_68	1_7_30	1_7	1
43	Reinforcing iron and rebar wor	1_7_30_68	1_7_30	1_7	1
44	Structural iron and steel work	1_7_30_68	1_7_30	1_7	1
45	Hazardous materials removal wo	1_7_30_68	1_7_30	1_7	1
46	Plasterers and stucco masons	1_7_13_108	1_7_13	1_7	1
47	Meter readers, utilities	1_7_2_31	1_7_2	1_7	1
48	Graders and sorters, agricultu	4_1_22_56	4_1_22	4_1	4
49	Sewing machine operators	4_1_67_115	4_1_67	4_1	4
50	Shoe and leather workers and r	4_1_67_115	4_1_67	4_1	4
51	Textile knitting and weaving m	4_1_67_115	4_1_67	4_1	4
52	Painting workers	4_1_67_115	4_1_67	4_1	4

	Title	Class_120	Class_67	Class_9	Class_4
1	Textile knitting and weaving m	4_1_67_115	4_1_67	4_1	4
2	Painting workers	4_1_67_115	4_1_67	4_1	4
3	Postal service mail sorters, p	4_1_67_8	4_1_67	4_1	4
4	Mail clerks and mail machine o	4_1_67_8	4_1_67	4_1	4
5	Janitors and building cleaners	4_1_60_3	4_1_60	4_1	4
6	Laundry and dry-cleaning worke	4_1_60_3	4_1_60	4_1	4
7	Pressers, textile, garment, an	4_1_60_3	4_1_60	4_1	4
8	Cleaners of vehicles and equip	4_1_60_3	4_1_60	4_1	4
9	Food preparation workers	4_1_60_116	4_1_60	4_1	4
10	Food preparation and serving r	4_1_60_116	4_1_60	4_1	4
11	Dishwashers	4_1_60_116	4_1_60	4_1	4
12	Butchers and other meat, poult	4_1_60_116	4_1_60	4_1	4
13	Packers and packagers, hand	4_1_60_116	4_1_60	4_1	4
14	Food servers, nonrestaurant	4_1_60_37	4_1_60	4_1	4
15	Maids and housekeeping cleaner	4_1_60_37	4_1_60	4_1	4
16	Nonfarm animal caretakers	4_1_60_37	4_1_60	4_1	4
17	Couriers and messengers	4_1_27_49	4_1_27	4_1	4
18	Postal service mail carriers	4_1_27_49	4_1_27	4_1	4
19	Parking lot attendants	4_1_27_49	4_1_27	4_1	4
20	Crossing guards	4_1_27_71	4_1_27	4_1	4
21	Ushers, lobby attendants, and	4_1_27_71	4_1_27	4_1	4
22	Models, demonstrators, and pro	4_1_27_71	4_1_27	4_1	4
23	Barbers	4_1_50_14	4_1_50	4_1	4
24	Cargo and freight agents	4_2_58_58	4_2_58	4_2	4
25	Shipping, receiving, and traff	4_2_58_58	4_2_58	4_2	4
26	Massage therapists	4_2_53_2	4_2_53	4_2	4
27	Bartenders	4_2_53_2	4_2_53	4_2	4
28	Hosts and hostesses, restauran	4_2_53_2	4_2_53	4_2	4
29	Embalmers and funeral attendan	4_2_53_2	4_2_53	4_2	4
30	Baggage porters, bellhops, and	4_2_53_2	4_2_53	4_2	4
31	Waiters and waitresses	4_2_53_34	4_2_53	4_2	4
32	Gaming services workers	4_2_53_34	4_2_53	4_2	4
33	Miscellaneous entertainment at	4_2_53_34	4_2_53	4_2	4
34	Cashiers	4_2_53_34	4_2_53	4_2	4
35	Counter and rental clerks	4_2_53_34	4_2_53	4_2	4
36	Gaming cage workers	4_2_53_34	4_2_53	4_2	4
37	Parts salespersons	4_2_11_64	4_2_11	4_2	4
38	Retail salespersons	4_2_11_64	4_2_11	4_2	4
39	Sales representatives, wholesa	4_2_11_64	4_2_11	4_2	4
40	Telemarketers	4_2_11_64	4_2_11	4_2	4
41	Hotel, motel, and resort desk	4_2_11_64	4_2_11	4_2	4
42	Tellers	4_2_11_75	4_2_11	4_2	4
43	Postal service clerks	4_2_11_75	4_2_11	4_2	4
44	Weighers, measurers, checkers,	4_2_11_75	4_2_11	4_2	4
45	Switchboard operators, includi	4_2_5_70	4_2_5	4_2	4
46	Telephone operators	4_2_5_70	4_2_5	4_2	4
47	Receptionists and information	4_2_5_70	4_2_5	4_2	4
48	Office clerks, general	4_2_5_70	4_2_5	4_2	4
49	Billing and posting clerks and	4_2_5_105	4_2_5	4_2	4
50	Bookkeeping, accounting, and a	4_2_5_105	4_2_5	4_2	4
51	Payroll and timekeeping clerks	4_2_5_105	4_2_5	4_2	4
52	Data entry keyers	4_2_5_105	4_2_5	4_2	4

	Title	Class_120	Class_67	Class_9	Class_4
1	Payroll and timekeeping clerks	4_2_5_105	4_2_5	4_2	4
2	Data entry keyers	4_2_5_105	4_2_5	4_2	4
3	Word processors and typists	4_2_5_105	4_2_5	4_2	4
4	Library technicians	4_2_62_53	4_2_62	4_2	4
5	File Clerks	4_2_62_53	4_2_62	4_2	4
6	Library assistants, clerical	4_2_62_53	4_2_62	4_2	4
7	Procurement clerks	4_2_66_114	4_2_66	4_2	4
8	Court, municipal, and license	4_2_66_114	4_2_66	4_2	4
9	Claims adjusters, appraisers,	4_2_66_114	4_2_66	4_2	4
10	Insurance claims and policy pr	4_2_66_114	4_2_66	4_2	4
11	Office and administrative supp	4_2_66_114	4_2_66	4_2	4
12	Bill and account collectors	4_2_66_112	4_2_66	4_2	4
13	Brokerage clerks	4_2_66_112	4_2_66	4_2	4
14	Credit authorizers, checkers,	4_2_66_112	4_2_66	4_2	4
15	Eligibility interviewers, gove	4_2_66_112	4_2_66	4_2	4
16	Interviewers, except eligibili	4_2_66_112	4_2_66	4_2	4
17	New accounts clerks	4_2_66_112	4_2_66	4_2	4
18	Correspondence clerks and orde	4_2_66_112	4_2_66	4_2	4
19	Human resources assistants, ex	4_2_66_112	4_2_66	4_2	4
20	Secretaries and administrative	4_2_66_112	4_2_66	4_2	4
21	Travel agents	4_2_66_99	4_2_66	4_2	4
22	Customer service representativ	4_2_66_99	4_2_66	4_2	4
23	Loan interviewers and clerks	4_2_66_99	4_2_66	4_2	4
24	Reservation and transportation	4_2_66_99	4_2_66	4_2	4
25	Proofreaders and copy markers	4_2_37_11	4_2_37	4_2	4
26	Door-to-door sales workers, ne	4_2_38_61	4_2_38	4_2	4
27	Hairdressers, hairstylists, an	4_2_44_111	4_2_44	4_2	4
28	Miscellaneous personal appeara	4_2_44_111	4_2_44	4_2	4
29	Pest control workers	2_9_59_106	2_9_59	2_9	2
30	Animal trainers	2_9_59_106	2_9_59	2_9	2
31	First-line supervisors of farm	2_9_59_106	2_9_59	2_9	2
32	Miscellaneous agricultural wor	2_9_59_106	2_9_59	2_9	2
33	Forest and conservation worker	2_9_59_106	2_9_59	2_9	2
34	Logging workers	2_9_59_106	2_9_59	2_9	2
35	Bus and truck mechanics and di	2_9_17_117	2_9_17	2_9	2
36	Maintenance and repair workers	2_9_17_117	2_9_17	2_9	2
37	Manufactured building and mobi	2_9_17_117	2_9_17	2_9	2
38	Riggers	2_9_17_117	2_9_17	2_9	2
39	Helpers—installation, mainten	2_9_17_117	2_9_17	2_9	2
40	Other installation, maintenanc	2_9_17_117	2_9_17	2_9	2
41	Stationary engineers and boile	2_9_17_35	2_9_17	2_9	2
42	Miscellaneous plant and system	2_9_17_35	2_9_17	2_9	2
43	Chemical processing machine se	2_9_17_35	2_9_17	2_9	2
44	Boilermakers	2_9_17_72	2_9_17	2_9	2
45	Electric motor, power tool, an	2_9_17_72	2_9_17	2_9	2
46	Millwrights	2_9_17_72	2_9_17	2_9	2
47	Electrical power-line installe	2_9_17_72	2_9_17	2_9	2
48	Sailors and marine oilers, and	2_9_17_69	2_9_17	2_9	2
49	Ship and boat captains and ope	2_9_17_69	2_9_17	2_9	2
50	Water and liquid waste treatme	2_9_26_52	2_9_26	2_9	2
51	Broadcast and sound engineerin	2_9_49_42	2_9_49	2_9	2
52	Avionics technicians	2_9_49_42	2_9_49	2_9	2



	Title	Class_120	Class_67	Class_9	Class_4
1	Broadcast and sound engineerin	2_9_49_42	2_9_49	2_9	2
2	Avionics technicians	2_9_49_42	2_9_49	2_9	2
3	Electrical and electronics rep	2_9_49_42	2_9_49	2_9	2
4	Electronic equipment installer	2_9_49_42	2_9_49	2_9	2
5	Electronic home entertainment	2_9_49_42	2_9_49	2_9	2
6	Electricians	2_9_49_5	2_9_49	2_9	2
7	Elevator installers and repair	2_9_49_5	2_9_49	2_9	2
8	Radio and telecommunications e	2_9_49_5	2_9_49	2_9	2
9	Security and fire alarm system	2_9_49_5	2_9_49	2_9	2
10	Automotive service technicians	2_9_49_5	2_9_49	2_9	2
11	Telecommunications line instal	2_9_49_5	2_9_49	2_9	2
12	Computer, automated teller, an	2_9_49_109	2_9_49	2_9	2
13	Home appliance repairers	2_9_64_113	2_9_64	2_9	2
14	Locksmiths and safe repairers	2_9_64_113	2_9_64	2_9	2
15	First-line supervisors/manager	2_9_32_79	2_9_32	2_9	2
16	First-line supervisors/manager	2_9_32_79	2_9_32	2_9	2
17	Derrick, rotary drill, and ser	2_9_32_79	2_9_32	2_9	2
18	First-line supervisors/manager	2_9_32_79	2_9_32	2_9	2
19	Material moving workers, inclu	2_9_29_119	2_9_29	2_9	2
20	Aircraft mechanics and service	2_9_57_45	2_9_57	2_9	2
21	Mining machine operators	2_9_48_27	2_9_48	2_9	2
22	Heating, air conditioning, and	2_9_6_78	2_9_6	2_9	2
23	Security guards and gaming sur	2_8_24_95	2_8_24	2_8	2
24	Animal control workers	2_8_4_91	2_8_4	2_8	2
25	Flight attendants	2_8_4_91	2_8_4	2_8	2
26	Transportation inspectors	2_8_4_91	2_8_4	2_8	2
27	Other transportation workers,	2_8_4_91	2_8_4	2_8	2
28	First-line supervisors/manager	2_8_4_76	2_8_4	2_8	2
29	Bailiffs, correctional officer	2_8_4_76	2_8_4	2_8	2
30	Locomotive engineers and opera	2_8_14_104	2_8_14	2_8	2
31	Railroad brake, signal, switch	2_8_14_104	2_8_14	2_8	2
32	Subway, streetcar, and other r	2_8_14_104	2_8_14	2_8	2
33	Dispatchers	3_4_39_9	3_4_39	3_4	3
34	Transportation, storage, and d	3_4_39_16	3_4_39	3_4	3
35	Property, real estate, and com	3_4_39_16	3_4_39	3_4	3
36	Production, planning, and expe	3_4_39_16	3_4_39	3_4	3
37	Food service managers	3_4_39_65	3_4_39	3_4	3
38	Chefs and head cooks	3_4_39_65	3_4_39	3_4	3
39	First-line supervisors/manager	3_4_39_65	3_4_39	3_4	3
40	First-line supervisors/manager	3_4_39_65	3_4_39	3_4	3
41	First-line supervisors/manager	3_4_39_65	3_4_39	3_4	3
42	Securities, commodities, and f	3_4_47_81	3_4_47	3_4	3
43	Accountants and auditors	3_4_47_81	3_4_47	3_4	3
44	Budget analysts	3_4_47_81	3_4_47	3_4	3
45	Credit analysts	3_4_47_81	3_4_47	3_4	3
46	Personal financial advisors	3_4_47_81	3_4_47	3_4	3
47	Insurance underwriters	3_4_47_81	3_4_47	3_4	3
48	Loan counselors and officers	3_4_47_81	3_4_47	3_4	3
49	Tax examiners, collectors, and	3_4_47_81	3_4_47	3_4	3
50	Tax preparers	3_4_47_81	3_4_47	3_4	3
51	Public relations specialists	3_4_47_102	3_4_47	3_4	3
52	Insurance sales agents	3_4_47_102	3_4_47	3_4	3

	Title	Class_120	Class_67	Class_9	Class_4
1	Public relations specialists	3_4_47_102	3_4_47	3_4	3
2	Insurance sales agents	3_4_47_102	3_4_47	3_4	3
3	Real estate brokers and sales	3_4_47_102	3_4_47	3_4	3
4	Agents and business managers o	3_4_47_102	3_4_47	3_4	3
5	Archivists, curators, and muse	3_4_55_118	3_4_55	3_4	3
6	Artists and related workers	3_4_55_118	3_4_55	3_4	3
7	Designers	3_4_55_118	3_4_55	3_4	3
8	Athletes, coaches, umpires, an	3_4_40_92	3_4_40	3_4	3
9	Recreation and fitness workers	3_4_40_92	3_4_40	3_4	3
10	Preschool and kindergarten tea	3_4_40_84	3_4_40	3_4	3
11	Child care workers	3_4_40_84	3_4_40	3_4	3
12	Residential advisors	3_4_40_84	3_4_40	3_4	3
13	Musicians, singers, and relate	3_4_33_80	3_4_33	3_4	3
14	Announcers	3_4_33_80	3_4_33	3_4	3
15	Writers and authors	3_4_33_82	3_4_33	3_4	3
16	Advertising sales agents	3_4_33_82	3_4_33	3_4	3
17	Actors	3_4_3_87	3_4_3	3_4	3
18	Dancers and choreographers	3_4_3_87	3_4_3	3_4	3
19	Photographers	3_4_65_46	3_4_65	3_4	3
20	Television, video, and motion	3_4_65_46	3_4_65	3_4	3
21	Psychologists	3_4_41_26	3_4_41	3_4	3
22	Lawyers, Judges, magistrates,	3_4_41_26	3_4_41	3_4	3
23	Counselors	3_4_41_6	3_4_41	3_4	3
24	Social workers	3_4_41_6	3_4_41	3_4	3
25	Opticians, dispensing	3_4_35_7	3_4_35	3_4	3
26	Dental assistants	3_4_35_7	3_4_35	3_4	3
27	Technical writers	3_4_34_73	3_4_34	3_4	3
28	Miscellaneous media and commun	3_4_54_103	3_4_54	3_4	3
29	Mathematicians, statisticians	3_5_51_18	3_5_51	3_5	3
30	Economists	3_5_51_18	3_5_51	3_5	3
31	Statistical assistants	3_5_51_18	3_5_51	3_5	3
32	Operations research analysts	3_5_51_90	3_5_51	3_5	3
33	Physical scientists, all other	3_5_51_90	3_5_51	3_5	3
34	Logisticians	3_5_51_90	3_5_51	3_5	3
35	Atmospheric and space scientis	3_5_51_83	3_5_51	3_5	3
36	Agricultural and food scientis	3_5_19_22	3_5_19	3_5	3
37	Biological scientists	3_5_19_22	3_5_19	3_5	3
38	Environmental scientists and g	3_5_19_22	3_5_19	3_5	3
39	Chemical engineers	3_5_19_100	3_5_19	3_5	3
40	Civil engineers	3_5_19_100	3_5_19	3_5	3
41	Environmental engineers	3_5_19_100	3_5_19	3_5	3
42	Industrial engineers, includin	3_5_19_100	3_5_19	3_5	3
43	Marine engineers and naval arc	3_5_19_100	3_5_19	3_5	3
44	Petroleum engineers	3_5_19_100	3_5_19	3_5	3
45	Engineers, all other, includin	3_5_19_100	3_5_19	3_5	3
46	Postsecondary teachers	3_5_63_50	3_5_63	3_5	3
47	Management analysts	3_5_63_50	3_5_63	3_5	3
48	Medical scientists and life sc	3_5_63_107	3_5_63	3_5	3
49	Dietitians and nutritionists	3_5_63_107	3_5_63	3_5	3
50	Computer and information syste	3_5_31_86	3_5_31	3_5	3
51	Industrial production managers	3_5_31_86	3_5_31	3_5	3
52	General and operations manager	3_5_31_86	3_5_31	3_5	3

	Title	Class_120	Class_67	Class_9	Class_4
1	Industrial production managers	3_5_31_86	3_5_31	3_5	3
2	General and operations manager	3_5_31_86	3_5_31	3_5	3
3	Construction managers	3_5_31_86	3_5_31	3_5	3
4	Engineering managers	3_5_31_86	3_5_31	3_5	3
5	Managers, all other	3_5_31_86	3_5_31	3_5	3
6	Cost estimators	3_5_31_86	3_5_31	3_5	3
7	Chief executives	3_5_31_97	3_5_31	3_5	3
8	Architects, except naval	3_5_31_97	3_5_31	3_5	3
9	Purchasing managers	3_5_31_97	3_5_31	3_5	3
10	Urban and regional planners	3_5_31_97	3_5_31	3_5	3
11	Clergy	3_5_15_60	3_5_15	3_5	3
12	Directors, religious activitie	3_5_15_60	3_5_15	3_5	3
13	Elementary and middle school t	3_5_15_60	3_5_15	3_5	3
14	Secondary school teachers	3_5_15_60	3_5_15	3_5	3
15	Other teachers and instructors	3_5_15_60	3_5_15	3_5	3
16	Other education, training, and	3_5_15_60	3_5_15	3_5	3
17	Education administrators	3_5_15_57	3_5_15	3_5	3
18	Gaming managers	3_5_15_57	3_5_15	3_5	3
19	Medical and health services ma	3_5_15_57	3_5_15	3_5	3
20	Natural sciences managers	3_5_15_57	3_5_15	3_5	3
21	Social and community service m	3_5_15_57	3_5_15	3_5	3
22	First-line supervisors/manager	3_5_15_57	3_5_15	3_5	3
23	Computer hardware engineers	3_5_21_1	3_5_21	3_5	3
24	Electrical and electronic engi	3_5_21_1	3_5_21	3_5	3
25	Materials engineers	3_5_21_85	3_5_21	3_5	3
26	Chemists and materials scienti	3_5_21_85	3_5_21	3_5	3
27	Aerospace engineers	3_5_21_94	3_5_21	3_5	3
28	Mechanical engineers	3_5_21_94	3_5_21	3_5	3
29	Financial managers	3_5_16_101	3_5_16	3_5	3
30	Actuaries	3_5_16_101	3_5_16	3_5	3
31	Financial examiners	3_5_16_101	3_5_16	3_5	3
32	Sales engineers	3_5_20_15	3_5_20	3_5	3
33	Astronomers and physicists	3_5_43_67	3_5_43	3_5	3
34	Engineering technicians, excep	3_6_12_93	3_6_12	3_6	3
35	Power plant operators, distrib	3_6_12_93	3_6_12	3_6	3
36	Surveyors, cartographers, and	3_6_12_17	3_6_12	3_6	3
37	Drafters	3_6_12_17	3_6_12	3_6	3
38	Surveying and mapping technici	3_6_12_17	3_6_12	3_6	3
39	Biological technicians	3_6_12_21	3_6_12	3_6	3
40	Chemical technicians	3_6_12_21	3_6_12	3_6	3
41	Agricultural inspectors	3_6_56_66	3_6_56	3_6	3
42	Construction and building insp	3_6_56_66	3_6_56	3_6	3
43	Conservation scientists and fo	3_6_36_28	3_6_36	3_6	3
44	Farmers, ranchers, and other a	3_6_36_28	3_6_36	3_6	3
45	Special education teachers	3_6_9_77	3_6_9	3_6	3
46	Occupational therapists	3_6_9_77	3_6_9	3_6	3
47	Physical therapists	3_6_9_77	3_6_9	3_6	3
48	Radiation therapists	3_6_9_77	3_6_9	3_6	3
49	Recreational therapists	3_6_9_77	3_6_9	3_6	3
50	Licensed practical and license	3_6_9_77	3_6_9	3_6	3
51	Occupational therapist assista	3_6_9_77	3_6_9	3_6	3
52	Physical therapist assistants	3_6_9_77	3_6_9	3_6	3

	Title	Class_120	Class_67	Class_9	Class_4
1	Occupational therapist assista	3_6_9_77	3_6_9	3_6	3
2	Physical therapist assistants	3_6_9_77	3_6_9	3_6	3
3	Physician assistants	3_6_9_40	3_6_9	3_6	3
4	Respiratory therapists	3_6_9_40	3_6_9	3_6	3
5	Diagnostic related technologis	3_6_9_40	3_6_9	3_6	3
6	First-line supervisors/manager	3_6_61_30	3_6_61	3_6	3
7	Detectives and criminal invest	3_6_61_30	3_6_61	3_6	3
8	Private detectives and investi	3_6_61_30	3_6_61	3_6	3
9	Chiropractors	3_6_8_54	3_6_8	3_6	3
10	Pharmacists	3_6_8_54	3_6_8	3_6	3
11	Audiologists	3_6_8_54	3_6_8	3_6	3
12	Speech-language pathologists	3_6_8_54	3_6_8	3_6	3
13	Other healthcare practitioners	3_6_8_54	3_6_8	3_6	3
14	Dentists	3_6_8_19	3_6_8	3_6	3
15	Veterinarians	3_6_8_19	3_6_8	3_6	3
16	Optometrists	3_6_8_25	3_6_8	3_6	3
17	First-line supervisors/manager	3_6_18_59	3_6_18	3_6	3
18	Fire fighters	3_6_18_59	3_6_18	3_6	3
19	Fire inspectors	3_6_18_59	3_6_18	3_6	3
20	First-line supervisors/manager	3_6_18_59	3_6_18	3_6	3
21	Aircraft pilots and flight eng	3_6_52_47	3_6_52	3_6	3
22	Air traffic controllers and ai	3_6_52_47	3_6_52	3_6	3
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