



Modul Praktikum Mata Kuliah Statistika II Transformasi Data - Stata

Muliati, SE., MSc.

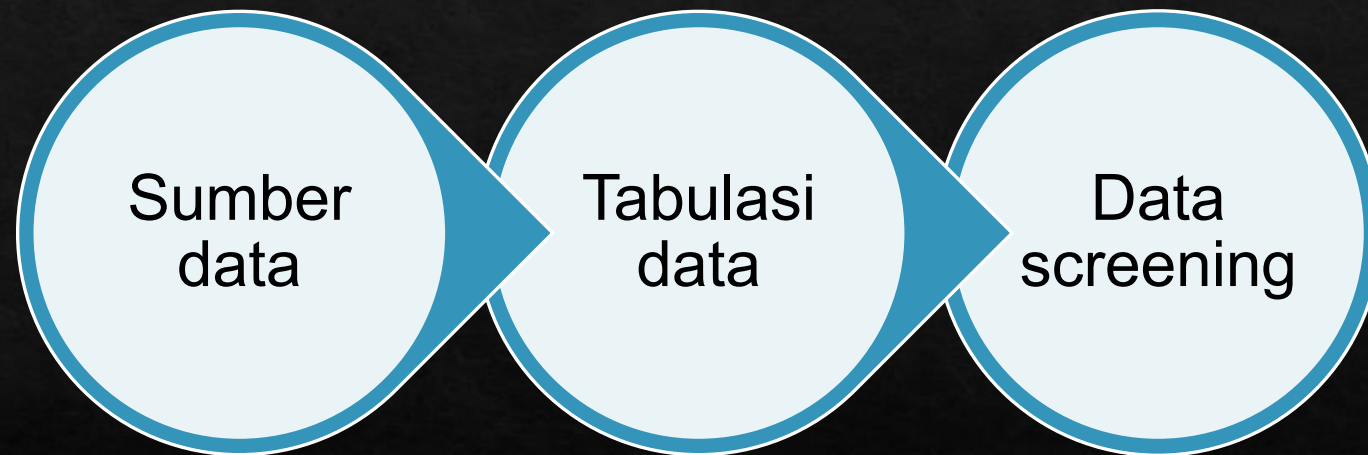
The background of the slide is a dense field of 3D-rendered numbers in various shades of blue. The numbers are of different sizes and are scattered across the frame, creating a sense of depth and data. Some numbers are more prominent than others, while others are partially obscured or in the background. The overall effect is a vibrant, digital landscape of numbers.

Transformasi Data

Muliati, SE., MSc

Universitas Mulawarman

Data Penelitian



Sumber Data

- ◇ Bank Indonesia: <https://www.bi.go.id/id/statistik/ekonomi-keuangan/seki/Default.aspx#floating-2>
- ◇ Dirjen Perimbangan Keuangan, Kementerian Keuangan: <http://www.djpk.kemenkeu.go.id/?p=5412>
- ◇ BPS Indonesia: <https://www.bps.go.id/publication.html>
- ◇ Indonesia Family Life Survey (IFLS): <https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS.html>

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A4 [Formulas] [Undo] [Redo] [Calculation Options]

1																				
2																				
	A	B	C	AC	AH	AM	AR	AW	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	E	

VII.2 PRODUK DOMESTIK BRUTO MENURUT LAPANGAN USAHA ATAS DASAR HARGA KONSTAN 2010 (Miliar Rp)										VII.2 GROSS DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN AT 2010 (Billions of Rp)									
LAPANGAN USAHA	2014	2015	2016	2017	2018	2019		2020				2021		INDUSTRIAL ORIGIN					
						Q3	Q4	Q1	Q2*	Q3*	Q4*	Q1*	Q2**						
1 PERTANIAN, KEHUTANAN & PERIKANAN	1,129,053	1,171,446	1,210,956	1,258,376	1,307,253	370,561	294,660	1,354,399	322,451	374,813	378,574	302,294	1,378,131	333,188	376,254	AGRICULTURE, FORESTRY			
2 Pertanian, Peternakan, Perburuan dan Jasa Pertanian	880,390	906,806	936,357	970,263	1,005,655	290,319	214,168	1,038,903	242,867	296,715	299,256	221,985	1,060,823	255,796	292,893	Agriculture, Livestock, Hu			
3 Tanaman pangan	268,427	280,019	287,217	293,858	298,027	78,614	45,636	292,883	71,796	96,781	84,258	50,413	303,247	80,433	88,882	Food crops			
4 Tanaman Hortikultura	124,301	127,110	130,832	135,649	145,131	42,523	33,693	153,158	35,278	42,961	44,963	36,337	159,539	36,341	43,751	Horticultural crops			
5 Tanaman Perkebunan	338,502	345,165	357,138	373,194	387,497	120,706	89,803	405,148	88,700	109,511	121,521	90,821	410,553	90,626	109,868	Plantation crops			
6 Peternakan	132,221	136,936	143,037	148,689	155,540	43,026	40,712	167,638	42,190	42,007	42,932	39,955	167,085	43,228	44,978	Livestock			
7 Jasa Pertanian dan Perburuan	16,938	17,575	18,134	18,873	19,460	5,450	4,323	20,077	4,902	5,455	5,582	4,459	20,398	5,169	5,415	Agricultural Services an			
8 Kehutanan dan Penebangan kayu	59,574	60,624	60,002	61,280	62,982	16,919	15,978	63,218	15,089	16,350	16,644	15,113	63,196	13,742	15,631	Forestry and Logging			
9 Perikanan	189,090	204,017	214,597	226,833	238,616	63,323	64,514	252,279	64,495	61,748	62,673	65,196	254,112	63,650	67,730	Fishery			
10 PERTAMBANGAN & PENGGALIAN	794,490	767,327	774,593	779,678	796,505	205,388	202,263	806,206	200,784	193,262	196,595	199,834	790,475	196,726	203,356	MINING AND QUARRYING			
11 Pertambangan Minyak dan Gas Bumi	307,162	307,326	313,744	302,653	298,420	72,407	72,378	289,980	70,549	67,348	67,235	67,452	272,583	65,701	63,937	Crude Petroleum, Natural			
12 Pertambangan Batubara dan Lignit	251,074	232,725	223,099	226,479	235,561	65,260	65,247	259,599	65,457	58,422	60,204	61,416	245,499	60,845	66,172	Coal and Lignite Mining			
13 Pertambangan Biji Logam,	98,258	87,703	89,303	95,150	103,719	24,987	20,736	88,003	23,119	27,820	27,293	27,598	105,829	28,778	32,851	Iron Ore mining			
14 Pertambangan dan Penggalian Lainnya	137,996	139,573	148,447	155,396	158,804	42,734	43,902	168,624	41,660	39,672	41,863	43,369	166,564	41,402	40,396	Other Mining and Quarryi			
15 INDUSTRI PENGOLAHAN	1,854,257	1,934,533	2,016,877	2,103,466	2,193,368	582,945	573,522	2,276,668	566,752	529,989	557,651	555,528	2,209,920	558,908	564,866	MANUFACTURING			
16 Industri Batubara dan Pengilangan Migas	216,751	214,312	220,392	219,849	219,832	54,224	54,167	217,402	54,860	49,866	50,190	47,687	202,604	50,638	51,549	Manufacture of Coal and			
17 Industri Makanan dan Minuman	502,856	540,756	585,786	639,834	690,463	194,289	185,476	744,171	184,175	187,625	195,565	188,550	755,915	188,686	193,159	Manufacture of Food Proc			
18 Pengolahan Tembakau	78,879	83,799	85,120	84,572	87,549	21,793	23,225	90,487	24,051	19,820	20,662	20,725	85,258	21,748	19,607	Manufacture of Tobacco f			
19 Industri Tekstil dan Pakaian Jadi	117,723	112,079	111,978	116,262	126,407	36,786	35,317	145,805	35,487	32,394	33,357	31,612	132,851	30,775	30,922	Manufacture of Textiles; a			

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Number: General, Currency (\$), Percentage (%), Thousand Separator (,), Decimal Places (0, .00, .00, .00)

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A1 : BELANJA MENURUT FUNGSI PADA REALISASI APBD 2019

	A	B	C	D	E	F	G	H
1	BELANJA MENURUT FUNGSI PADA REALISASI APBD 2019							
2	<i>Per 13 November 2020</i>							
3	<i>Jumlah: 542 daerah</i>							
4								
5	Kodepemda	Nama Pemda	Pelayanan Umum	Ketertiban dan Keamanan	Ekonomi	Lingkungan Hidup	Perumahan dan Fasilitas Umum	Keseh
6	01.00	Provinsi Aceh	4,280,100,065,036	204,849,019,482	1,633,985,771,602	16,611,151,154	2,334,652,976,973	2,369,49
7	01.01	Kab. Aceh Barat	467,417,546,528	21,701,198,455	102,241,575,556	9,628,146,471	149,365,286,046	273,4
8	01.02	Kab. Aceh Besar	792,810,993,681	15,385,254,313	134,141,926,355	15,833,148,982	168,316,253,468	250,9
9	01.03	Kab. Aceh Selatan	490,349,973,696	14,503,823,579	115,597,064,890	12,136,200,865	131,495,063,159	293,10
10	01.04	Kab. Aceh Singkil	330,911,130,473	14,709,671,157	87,380,804,559	14,222,105,043	89,343,610,547	126,10
11	01.05	Kab. Aceh Tengah	458,639,022,510	14,268,610,622	69,057,727,351	16,216,862,851	190,834,183,025	298,49
12	01.06	Kab. Aceh Tenggara	535,030,125,867	25,736,038,301	78,447,300,989	12,074,614,300	166,944,907,836	138,8
13	01.07	Kab. Aceh Timur	755,040,610,992	21,308,520,777	70,901,519,342	34,967,991,943	285,306,448,846	257,14
14	01.08	Kab. Aceh Utara	997,325,261,739	16,453,340,020	103,550,643,963	48,643,304,769	246,588,059,816	457,8
15	01.09	Kab. Bireuen	782,697,071,757	8,801,639,559	92,562,632,567	-	229,984,163,805	346,0
16	01.10	Kab. Pidie	810,795,087,654	12,530,522,415	112,280,286,664	25,277,091,949	222,877,512,376	452,0
17	01.11	Kab. Simeulue	330,468,543,409	11,683,859,542	85,465,002,650	9,079,214,524	137,550,591,707	183,6
18	01.12	Kota Banda Aceh	346,839,166,859	20,937,436,929	102,922,640,046	60,833,389,230	132,573,753,011	194,7
19	01.13	Kota Sabang	188,737,106,958	21,791,621,930	51,409,765,582	11,463,159,455	122,017,263,734	103,5



B1R2[1]

1

Snapshots

	B1R2	B1R5	B1R7	B1R8	B2R1	kalori	food	nfood	expend
1	1	1	2500106	1	5	1651.604286	1924071.429	2987004.333	4911075.762
2	1	1	2500106	2	6	1735.9425	2378828.571	1981180.333	4360008.905
3	1	1	2500106	3	4	1559.869286	1494300	1868861.667	3363161.667
4	1	1	2500106	4	2	1922.277143	1189242.857	1709029.333	2898272.19
5	1	1	2500106	5	5	1452.962429	1643571.429	1927408.333	3570979.762
6	1	1	2500106	6	4	1183.882143	2123185.714	2876424	4999609.714
7	1	1	2500106	7	5	1789.936714	1689428.571	2239248.333	3928676.905
8	1	1	2500106	8	3	1960.995238	1427957.143	1402535.667	2830492.81
9	1	1	2500106	9	5	1430.499571	1441285.714	1995813.667	3437099.381
10	1	1	2500106	10	4	1940.142321	2119028.571	2324243.667	4443272.238
11	1	1	2500208	1	6	2440.829881	6605528.571	7062125	13667653.57
12	1	1	2500208	2	6	1472.38119	1823014.286	2967359.667	4790373.952
13	1	1	2500208	3	1	2893.2	1223400	1592859.333	2816259.333
14	1	1	2500208	5	6	1673.455952	1886357.143	1563276.667	3449633.81
15	1	1	2500208	6	5	1144.115714	1568614.286	2088946	3657560.286
16	1	1	2500208	7	3	1504.358333	1056171.429	2357975.333	3414146.762
17	1	1	2500208	9	5	1922.358286	1496314.286	2625636.333	4121950.619
18	1	1	2500208	10	5	1762.021429	1636285.714	2343967.333	3980253.048
19	1	1	2500303	2	4	1870.160714	1038000	1522725	2560725
20	1	1	2500303	3	4	1845.148214	1674000	1631463.333	3305463.333
21	1	1	2500303	4	2	3157.160714	1930714.286	1043146.667	2973860.952
22	1	1	2500303	5	1	2237.628571	516000	595480	1111480
23	1	1	2500303	6	1	2305.914286	447000	489890	936890
24	1	1	2500303	7	1	2105.253571	460285.7143	724265	1184550.714
25	1	1	2500303	8	7	1879.221429	2751857.143	2104366.667	4856223.81
26	1	1	2500303	10	6	1437.838095	1513285.714	1124514.667	2637800.381

Variables	
Variable	Label
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<input checked="" type="checkbox"/>	B1R1
<input checked="" type="checkbox"/>	B1R2
<input checked="" type="checkbox"/>	B1R5
<input checked="" type="checkbox"/>	B1R7
<input checked="" type="checkbox"/>	B1R8
<input checked="" type="checkbox"/>	B2R1
<input checked="" type="checkbox"/>	kalori
<input checked="" type="checkbox"/>	food
<input checked="" type="checkbox"/>	nfood
<input checked="" type="checkbox"/>	expend

Properties	
Variables	
Name	B1R2
Label	
Type	byte
Format	%8.0g
Value Label	
Notes	

Data	
Filename	SUSENAS2014_M43.DTA
Label	
Notes	
Variables	24
Observations	285,400

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A E C Q AD AQ BC BE BF BG BH BI BJ BK BL BN BO BP

1.25 SUKU BUNGA, DISKONTO, IMBALAN ' (Persen Per Tahun) **1.25 INTEREST RATE, DISCOUNT, RATE OF RETURN ' (Percent Per Annum)**

JENIS SIMPANAN AND JANGKA WAKTU		2017	2018	2019	2020	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	2021	Aug	TYPE OF DEPOSITS AND MATURITY
1	Policy Rate	4.25	6.00	5.00	3.75	3.75	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	Policy Rate
2	Sertifikat Bank Indonesia															Bank Indonesia Certificate
3	1 Bulan	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	1 Month
4	3 Bulan	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	3 Months
5	6 Bulan	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	6 Months
6	9 Bulan	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	9 Months
7	12 Bulan	0.00	0.00	5.75	-	-	-	-	-	-	-	-	-	-	-	12 Months
8	Sukuk Bank Indonesia 2)															Bank Indonesia Sukuk2)
9	7 Hari	0.00	6.00	5.00	3.75	3.75	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	7 Days
10	14 Hari	0.00	6.20	5.01	3.52	3.52	3.27	3.27	3.27	3.27	3.27	3.15	2.98	3.00	3.00	14 Days
11	1 Bulan	0.00	0.00	5.04	3.55	3.53	3.27	3.27	3.27	3.27	3.28	3.16	3.01	3.03	3.03	1 Months
12	3 Bulan	0.00	0.00	5.06	3.57	3.56	3.30	3.29	3.29	3.30	3.29	3.19	2.99	3.05	3.05	3 Months
13	6 Bulan	0.00	0.00	0.00	-	-	-	-	-	3.34	3.34	3.34	3.19	3.21	3.21	6 Months

Th 1990-2003 Th 2002-2009 1.25A Th 2010-2016 **1.25A** [Grid]

Statistik Deskriptif

- ◇ Mengukur *central tendency*
 - ◇ Mean, untuk data interval/rasio
 - ◇ Median, untuk seluruh jenis data kecuali data nominal
 - ◇ Modus, untuk seluruh data
- ◇ Mengukur jarak/dispersi
 - ◇ Standar deviasi
 - ◇ Range/interval

Data: Skala Pengukuran

Nominal

Penggo-
longan

Ordinal

Penggo-
longan

Tingkatan

Interval

Penggo-
longan

Interval
/jarak yang
sama

Rasio

Tingkatan/
interval

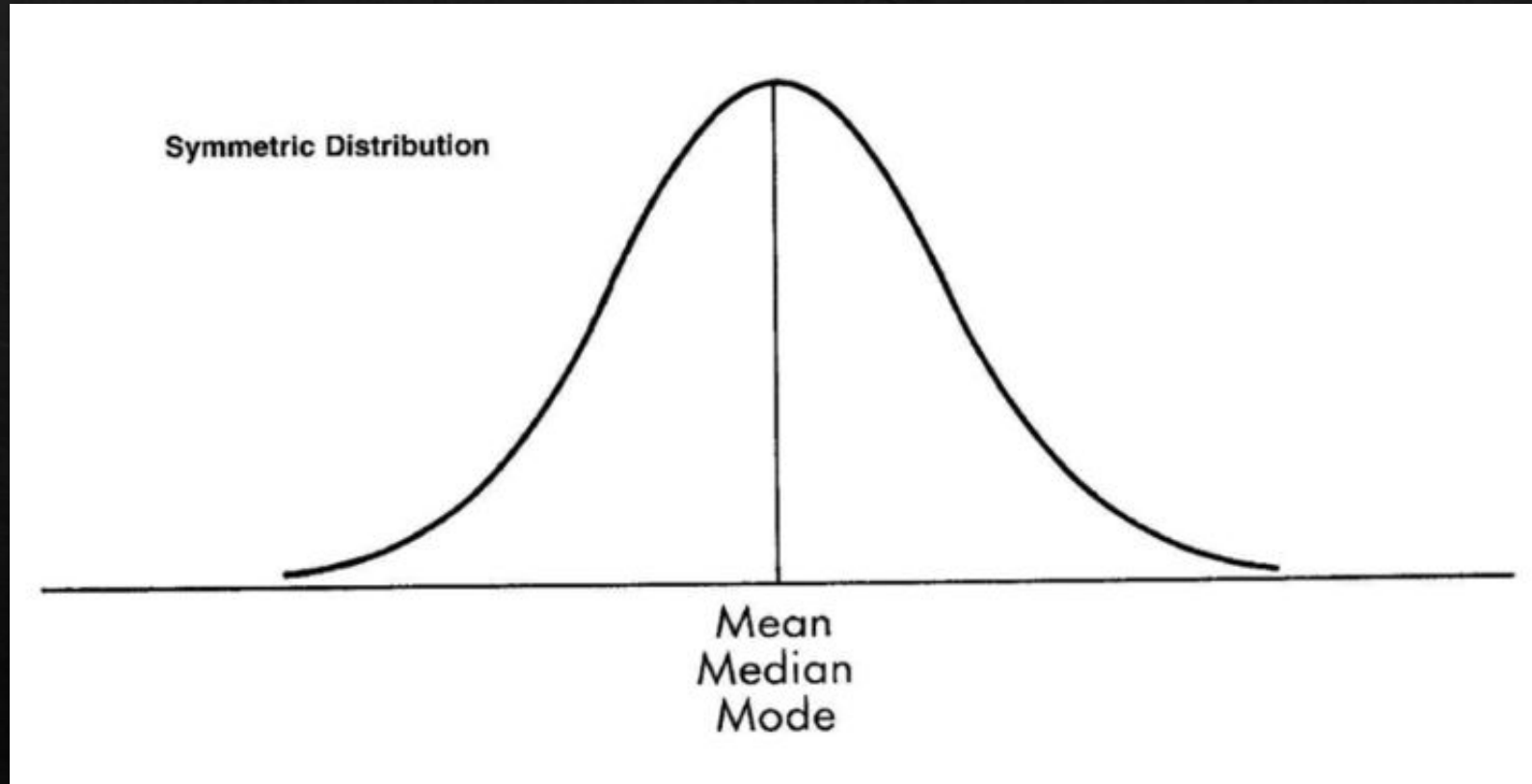
Punya nilai 0

Operasi
matematika

Distribusi Data

- ◇ Distribusi adalah suatu fungsi yang menunjukkan semua nilai dari sebuah data dan seberapa sering nilai tersebut terjadi
- ◇ Visualisasi:
 - ◇ Data kategorik → Persentasi dari setiap kelompok data
 - ◇ Data numerik → Susunan ascending (dari kecil ke besar)
- ◇ Bukan tentang GRAFIK

Distribusi Normal



Simetri (skewness/kemiringan)

Distribusi normal berdasarkan pada data numerik dan grafik akan membentuk lonceng simetris. Dapat dikatakan hampir 68% data berkisar di sekitar mean (average atau nilai rata-rata). Makin menjauh dari mean baik ke arah kiri atau kanan, akan makin menurun, ditunjukkan dengan kurva yang menurun.

Menunjukkan pengaruh outlier (atau data yang diluar kebiasaan) tidak ada.

Dikarenakan simetris, maka mean dan median berada di titik yang sama, tepat di tengah kurva.

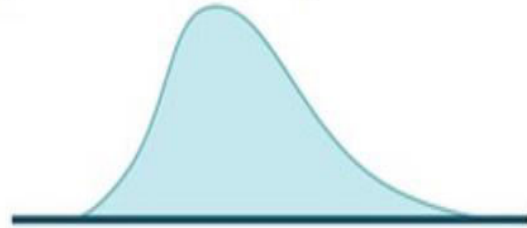
Non-normal Distribution

Non-Normal distributions:

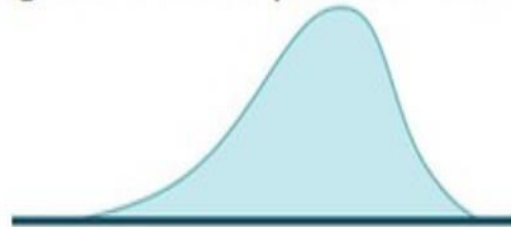
- **Bimodal:** suggestive of two different populations



- **Skewed to-the-right (positive skew):** mean > median > mode



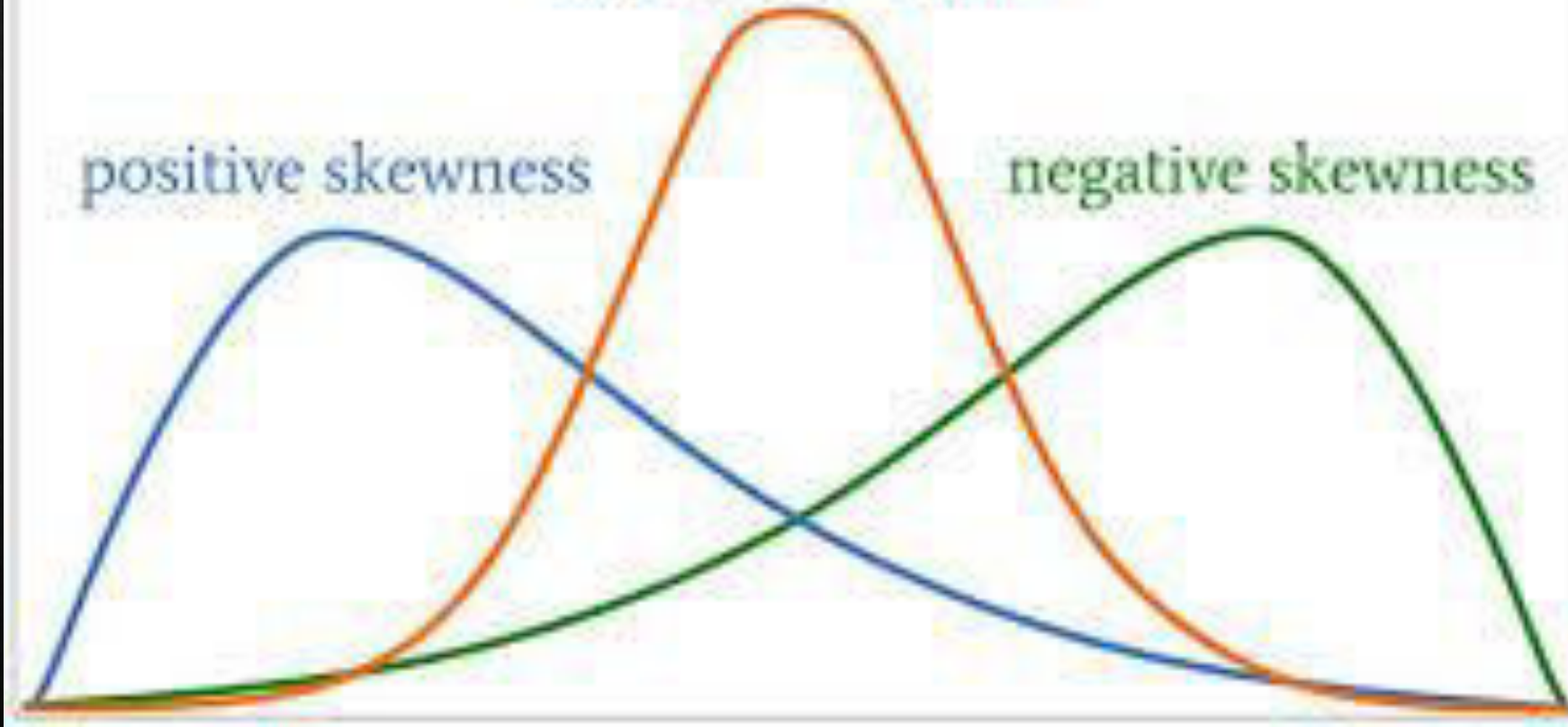
- **Skewed to-the-left (negative skew):** mean < median < mode



skewness = zero

positive skewness

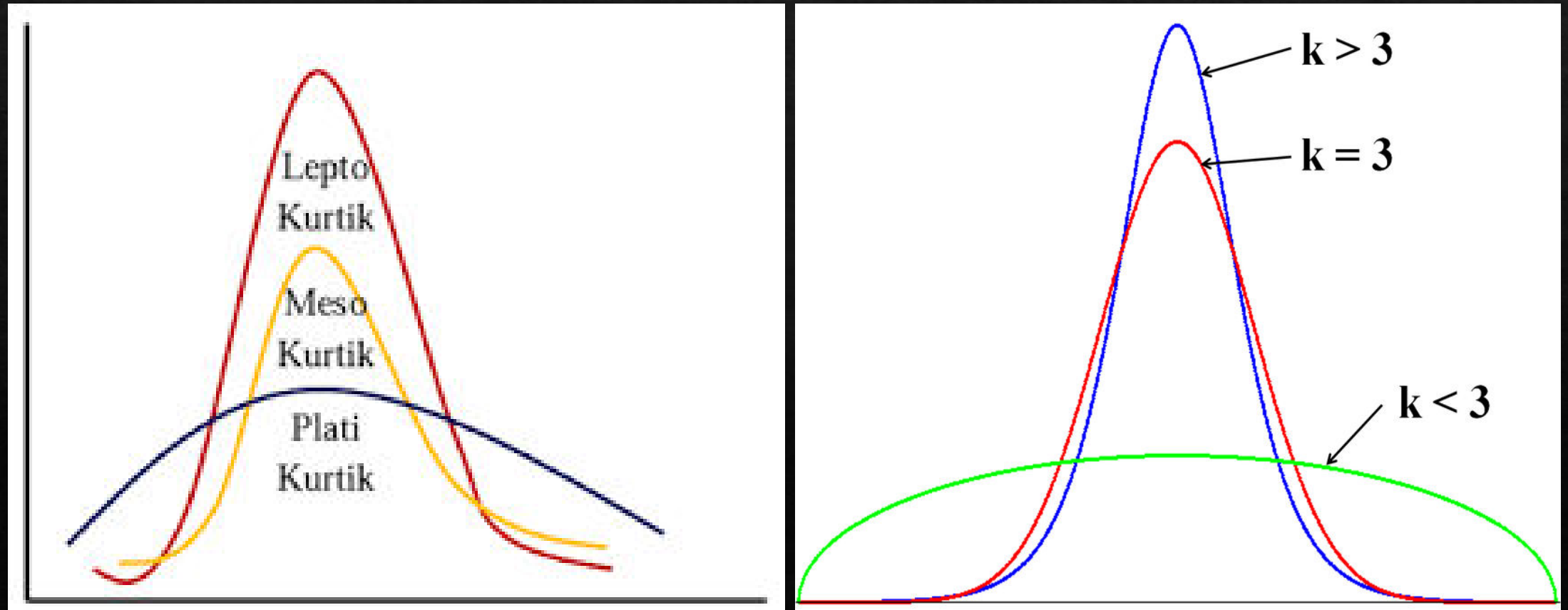
negative skewness



Karakteristik distribusi normal

- ◇ Bentuk normal → matematis, bukan “aneh”
- ◇ Bentuk distribusi selalu simetris → ketika dibelah 2 terlihat sama besar, setiap belahan menghitung 50% dari skor/kasus.
- ◇ Titik tertinggi dari distribusi menunjukkan nilai mean, median, dan modus
- ◇ Kurtosis = 3
- ◇ Ekor kurva tidak menyentuh garis dasar

Derajat keruncingan



Tabel Trafik(1)

$$P(B)=P(N,A)$$

N

No. of Trunks (N)	Poisson Traffic Capacity in Erlangs							Poisson Traffic Capacity in Erlangs (Continued)							
	Traffic (A) in Erlangs for P =							Traffic (A) in Erlangs for P =							
	.001	.002	.005	.010	.020	.050	.100	No. of Trunks (N)	.001	.002	.005	.010	.020	.050	.100
1	.001	.002	.005	.011	.021	.053	.106	41	24.0	25.0	26.4	27.6	28.9	31.1	33.1
2	.044	.065	.104	.150	.214	.358	.531	42	24.8	25.8	27.2	28.4	29.8	32.0	33.9
3	.192	.244	.338	.436	.567	.817	1.10	43	25.5	26.5	28.0	29.2	30.6	32.9	34.9
4	.428	.519	.673	.822	1.02	1.37	1.77	44	26.3	27.3	28.8	30.1	31.5	33.7	35.8
5	.739	.868	1.08	1.28	1.55	1.97	2.44	45	27.1	28.1	29.6	30.9	32.3	34.6	36.7
6	1.11	1.27	1.54	1.79	2.17	2.81	3.14	46	27.9	28.9	30.4	31.7	33.2	35.5	37.6
7	1.52	1.72	2.04	2.33	2.69	3.28	3.89	47	28.6	29.7	31.2	32.5	34.0	36.4	38.5
8	1.97	2.21	2.57	2.91	3.31	3.97	4.67	48	29.4	30.5	32.0	33.4	34.9	37.2	39.4
9	2.45	2.72	3.13	3.50	3.94	4.69	5.42	49	30.2	31.3	32.9	34.2	35.7	38.1	40.3
10	2.97	3.26	3.72	4.14	4.61	5.42	6.22	50	31.0	32.1	33.7	35.0	36.6	39.0	41.2
11	3.50	3.82	4.32	4.78	5.31	6.17	7.03	51	31.8	32.9	34.5	35.9	37.4	39.9	42.1
12	4.03	4.40	4.94	5.43	6.03	6.92	7.83	52	32.5	33.7	35.3	36.7	38.3	40.8	43.0
13	4.61	5.00	5.58	6.11	6.69	7.69	8.64	53	33.3	34.5	36.1	37.6	39.2	41.6	43.9
14	5.19	5.61	6.23	6.78	7.42	8.47	9.47	54	34.1	35.3	37.0	38.4	40.0	42.5	44.8
15	5.78	6.23	6.89	7.47	8.14	9.25	10.3	55	34.9	36.1	37.8	39.2	40.9	43.4	45.7
16	6.42	6.87	7.57	8.18	8.89	10.1	11.1	56	35.7	36.9	38.6	40.1	41.8	44.3	46.6
17	7.03	7.52	8.25	8.89	9.64	10.8	12.0	57	36.5	37.7	39.3	40.9	42.6	45.2	47.6
18	7.67	8.17	8.94	9.61	10.4	11.6	12.8	58	37.3	38.5	40.3	41.8	43.5	46.1	48.5
19	8.31	8.84	9.65	10.4	11.1	12.4	13.7	59	38.1	39.3	41.1	42.6	44.3	47.0	49.4
20	8.97	9.52	10.4	11.1	11.9	13.3	14.5	60	38.9	40.1	41.9	43.5	45.2	47.9	50.3
21	9.61	10.2	11.1	11.8	12.7	14.1	15.4	61	39.7	40.9	42.8	44.3	46.1	48.8	51.2
22	10.3	10.9	11.8	12.6	13.5	14.9	16.3	62	40.5	41.8	43.6	45.2	46.9	49.6	52.1
23	11.0	11.6	12.5	13.3	14.3	15.7	17.1	63	41.3	42.6	44.4	46.0	47.8	50.5	53.1
24	11.6	12.3	13.3	14.1	15.1	16.6	18.0	64	42.1	43.4	45.3	46.9	48.7	51.4	54.0
25	12.3	13.0	14.0	14.9	15.9	17.4	18.8	65	42.9	44.2	46.1	47.7	49.6	52.3	54.9
26	13.0	13.7	14.7	15.6	16.6	18.2	19.7	66	43.7	45.0	46.9	48.6	50.4	53.2	55.8
27	13.8	14.4	15.5	16.4	17.4	19.1	20.6	67	44.5	45.9	47.8	49.4	51.3	54.1	56.7
28	14.4	15.2	16.3	17.2	18.2	19.9	21.5	68	45.3	46.7	48.7	50.3	52.2	55.0	57.7
29	15.1	15.9	17.0	18.0	19.0	20.8	22.4	69	46.1	47.5	49.5	51.2	53.1	55.9	58.6
30	15.9	16.6	17.8	18.8	19.9	21.6	23.2	70	47.0	48.4	50.3	52.0	53.9	56.8	59.5
31	16.6	17.4	18.5	19.5	20.7	22.5	24.1	71	47.8	49.2	51.2	52.9	54.8	57.7	60.4
32	17.3	18.1	19.3	20.3	21.5	23.3	25.0	72	48.6	50.0	52.0	53.8	55.7	58.6	61.4
33	18.1	18.9	20.1	21.1	22.3	24.2	25.9	73	49.4	50.8	52.9	54.6	56.6	59.5	62.3
34	18.8	19.6	20.9	21.8	23.1	25.1	26.8	74	50.3	51.7	53.7	55.5	57.4	60.4	63.2
35	19.5	20.4	21.6	22.7	23.9	25.9	27.7	75	51.1	52.5	54.6	56.3	58.3	61.3	64.1
36	20.3	21.1	22.4	23.5	24.8	26.8	28.6	76	51.9	53.4	55.4	57.2	59.2	62.3	65.1
37	21.0	21.9	23.2	24.3	25.6	27.6	29.4	77	52.7	54.2	56.3	58.1	60.1	63.2	66.0
38	21.8	22.7	24.0	25.1	26.4	28.5	30.3	78	53.5	55.0	57.1	58.9	60.9	64.1	66.9
39	22.5	23.4	24.8	26.0	27.3	29.4	31.3	79	54.4	55.9	58.0	59.8	61.8	65.0	67.9
40	23.3	24.2	25.6	26.8	28.1	30.2	32.1	80	55.2	56.7	58.9	60.7	62.7	65.9	68.9

(table continues)

(table continues)

Tabel Trafik (2)

$$P(N,A)=0.01$$

Poisson Traffic Capacity in Erlangs							Poisson Traffic Capacity in Erlangs (Continued)								
No. of Trunks (N)	Traffic (A) in Erlangs for P =						No. of Trunks (N)	Traffic (A) in Erlangs for P =							
	.001	.002	.005	.010	.020	.050		.100	.001	.002	.005	.010	.020	.050	.100
1	.001	.002	.005	.011	.021	.053	.106	41	24.0	25.0	26.4	27.6	28.9	31.1	33.1
2	.044	.065	.104	.150	.214	.358	.531	42	24.8	25.8	27.2	28.4	29.8	32.0	33.9
3	.192	.244	.338	.436	.567	.817	1.10	43	25.5	26.5	28.0	29.2	30.6	32.9	34.9
4	.428	.519	.673	.822	1.02	1.37	1.75	44	26.3	27.3	28.8	30.1	31.5	33.7	35.8
5	.739	.868	1.08	1.28	1.55	1.97	2.44	45	27.1	28.1	29.6	30.9	32.3	34.6	36.7
6	1.11	1.27	1.54	1.79	2.11	2.61	3.14	46							
7	1.52	1.72	2.04	2.33	2.69	3.28	3.89	47							
8	1.97	2.21	2.57	2.91	3.31	3.97	4.67	48							
9	2.45	2.72	3.13	3.50	3.94	4.69	5.42	49							
10	2.97	3.26	3.70	4.14	4.61	5.42	6.22	50							
11	3.50	3.82	4.32	4.78	5.31	6.17	7.03	51							
12	4.03	4.40	4.94	5.43	6.00	6.92	7.83	52							
13	4.61	5.00	5.58	6.11	6.79	7.69	8.64	53							
14	5.19	5.61	6.23	6.78	7.42	8.14									
15	5.78	6.23	6.89	7.47	8.14										
16	6.42	6.87	7.57	8.18	8.89										
17	7.03	7.52	8.25	8.89	9.64										
18	7.67	8.17	8.94	9.61	10.4	11.6	12.8	58							
19	8.31	8.84	9.65	10.4	11.1	12.4	13.7	59							
20	8.97	9.52	10.4	11.1	11.9	13.3	14.5	60							
21	9.61	10.2	11.1	11.8	12.7	14.1	15.4	61							
22	10.3	10.9	11.8	12.6	13.5	14.9	16.3	62							
23	11.0	11.6	12.5	13.3	14.3	15.7	17.1	63							
24	11.6	12.3	13.3	14.1	15.1	16.6	18.0	64							
25	12.3	13.0	14.0	14.9	15.9	17.4	18.8	65							
26	13.0	13.7	14.7	15.6	16.6	18.2	19.7	66							
27	13.8	14.4	15.5	16.4	17.4	19.1	20.6	67							
28	14.4	15.2	16.3	17.2	18.2	19.9	21.5	68							
29	15.1	15.9	17.0	18.0	19.0	20.8	22.4	69							
30	15.9	16.6	17.8	18.8	19.9	21.6	23.2	70							
31	16.6	17.4	18.5	19.5	20.7	22.5	24.1	71	47.8	49.2	51.2	52.9	54.8	57.7	60.4
32	17.3	18.1	19.3	20.3	21.5	23.3	25.0	72	48.6	50.0	52.0	53.8	55.7	58.6	61.4
33	18.1	18.9	20.1	21.1	22.3	24.2	25.9	73	49.4	50.8	52.9	54.6	56.6	59.5	62.3
34	18.8	19.6	20.9	21.9	23.1	25.1	26.8	74	50.3	51.7	53.7	55.5	57.4	60.4	63.2
35	19.5	20.4	21.6	22.7	23.9	25.9	27.7	75	51.1	52.5	54.6	56.3	58.3	61.3	64.1
36	20.3	21.1	22.4	23.5	24.8	26.8	28.6	76	51.9	53.4	55.4	57.2	59.2	62.3	65.1
37	21.0	21.9	23.2	24.3	25.6	27.6	29.4	77	52.7	54.2	56.3	58.1	60.1	63.2	66.0
38	21.8	22.7	24.0	25.1	26.4	28.5	30.3	78	53.5	55.0	57.1	58.9	60.9	64.1	66.9
39	22.5	23.4	24.8	26.0	27.3	29.4	31.3	79	54.4	55.9	58.0	59.8	61.8	65.0	67.9
40	23.3	24.2	25.6	26.8	28.1	30.2	32.1	80	55.2	56.7	58.9	60.7	62.7	65.9	68.9

N=10

A=4.14 E

Sistem dengan N = 10 trunk dan P(B) = 0.01:

Dapat menhandel trafik (A) = 4.14 E

Transformasi Data

- ◇ Kita ingin membuat data menjadi normal a.k.a simetris. Mengapa?
 - ◇ Memudahkan dalam proses 'melihat' data secara keseluruhan
 - ◇ Memastikan asumsi sebelum prediksi
 - ◇ Mengurangi bias dalam menarik kesimpulan
- ◇ Cara mentransformasi data
 - ◇ Fungsi matematis
 - ◇ Umum dipakai: metode pangkat dan logaritma

Metode Transformasi

- ◇ Transformasi akar $\rightarrow \sqrt{x}$
- ◇ Transformasi kuadrat $\rightarrow x^2$
- ◇ Transformasi kubik x^3
- ◇ Transformasi inverse (kebalikan) $f(x) \rightarrow f^{-1}(x)$
- ◇ Transformasi logaritma \rightarrow basis 10, e dll
- ◇ Dll

Transformasi Log

- ◇ $Y' = \log(Y)$
- ◇ Data bilangan positif
- ◇ Jika ada data empirik = 0 $\rightarrow Y' = \log(Y + 1)$
- ◇ Jika ada data < 1 maka untuk menghilangkan nilai negatif \rightarrow semua data dikalikan dengan suatu konstanta $\rightarrow Y' = \log(kY)$

Transformasi Akar Kuadrat

- ◇ Tujuan → agar ragam data homogen
- ◇ Digunakan untuk data enumerasi kecil
- ◇ Sebaran data mengikuti distribusi poisson – probabilita peluang berulang
- ◇ Untuk data yang ada nilai 0 atau <10 digunakan $Y' = \sqrt{Y + 0.5}$

Cek Distribusi dan Transformasi Data

- ◇ Buka excel → data-latihan_metolit.xls
- ◇ Buka stata
- ◇ Input data manual ke data editor, copy paste dari file excel
- ◇ Atau import data .dta .csv .txt
- ◇ Running file .do

Terimakasih

Syntax Stata untuk Transformasi

```
clear all
set more off

#input/import data

#label variable all
#idcode = id responden
#age = umur saat ini
#married = status pernikahan
#educ = pendidikan formal
#industry = sektor kerja
#wage = upah per jam dollar
#hours = jam kerja per minggu
#tenure = lama kerja dalam tahun

label variable idcode "id responden"
label variable age "umur saat ini"
label variable married "status pernikahan"
label variable educ "pendidikan formal"
label variable industry "sektor kerja"
label variable wage "upah per jam kerja"
label variable hours "jam kerja per minggu"
label variable tenure "lama kerja dalam tahun"

save "C:\Users\Ipung\Documents\DATA\AKU\BAHAN
AJAR\KEMENKEU_METOLIT\transformasi data\progres1.dta"
#variabel yang digunakan: wage, educ, age, hours

#cek distribusi masing-masing variabel

#cek variabel wage
hist wage
sum wage, detail

#data tidak normal,--> transform

gen lwage=log(wage)
hist lwage
sum lwage, detail

#cek variabel educ
hist educ
sum educ, detail
```

```

#cek variabel age
hist age
sum age, detail
gen age2=age^2
hist age2

#cek variabel hours
hist hours
sum hours, detail

```

Data-Mentah Latihan Transformasi Data

idcode	age	married	educ	industry	wage	hours	tenure
1	37	single	12	Transport/Comm/Utility	11.74	48	5.3
2	37	single	12	Manufacturing	6.40	40	5.3
3	42	single	12	Manufacturing	5.02	40	1.3
4	43	married	17	Professional Services	9.03	42	1.8
5	42	married	12	Manufacturing	8.08	48	17.8
6	39	married	12	Professional Services	4.63	30	2.3
7	37	single	12	Transport/Comm/Utility	10.49	40	19.0
8	40	married	18	Professional Services	17.21	45	14.2
9	40	married	14	Professional Services	13.08	8	5.5
10	40	married	15	Professional Services	7.75	50	2.3
11	39	married	16	Professional Services	16.80	16	8.4
12	40	married	15	Professional Services	15.48	40	13.8
13	40	married	15	Wholesale/Retail Trade	5.23	40	7.8
14	40	single	15	Professional Services	10.16	40	5.6
15	39	married	15	Professional Services	9.66	4	4.7
16	41	married	15	Professional Services	9.06	32	3.0
17	42	married	15	Professional Services	8.05	45	8.1
18	41	married	14	Professional Services	11.10	24	3.4
19	42	married	14	Professional Services	9.58	40	5.4
20	37	single	12	Business/Repair Svc	4.18	40	0.9
21	44	single	16	Professional Services	9.79	40	7.9
22	41	married	18	Public Administration	28.46	35	3.5
23	35	married	12	Transport/Comm/Utility	10.19	38	17.3
24	44	married	18	Professional Services	3.05	25	2.9
25	35	single	12	Transport/Comm/Utility	3.53	40	0.8
26	35	single	15	Finance/Ins/Real Estate	5.85	40	0.3
27	36	single	16	Professional Services	35.73	45	6.4
28	38	married	12	Professional Services	4.43	18	3.3

idcode	age	married	educ	industry	wage	hours	tenure
29	40	single	12	Professional Services	5.03	55	0.8
30	42	married	12	Wholesale/Retail Trade	5.78	40	7.3
31	38	married	10	Wholesale/Retail Trade	5.11	40	5.9
32	44	single	15	Professional Services	25.16	18	2.1
33	38	married	12	Professional Services	4.40	30	3.3
34	39	married	13	Wholesale/Retail Trade	4.71	9	9.8
35	40	married	15	Professional Services	8.05	24	3.2
36	36	married	13	Transport/Comm/Utility	16.74	38	16.1
37	34	married	12	Manufacturing	5.72	38	2.5
38	36	married	12	Professional Services	7.46	40	1.1
39	36	single	14	Manufacturing	6.79	40	0.5
40	39	single	11	Manufacturing	12.50	40	9.3
41	40	married	12	Finance/Ins/Real Estate	17.70	35	9.1
42	45	married	14	Professional Services	12.08	8	0.0
43	38	single	11	Manufacturing	9.41	40	1.5
44	44	single	17	Entertainment/Rec Svc	13.17	44	1.3
45	36	married	18	Professional Services	11.06	35	0.0
46	41	married	17	Professional Services	3.74	18	2.8
47	41	married	16	Wholesale/Retail Trade	4.03	8	5.6
48	38	single	12	Public Administration	10.84	40	17.4
49	43	single	8	Manufacturing	4.35	40	1.1
50	45	married	12	Professional Services	4.71	20	2.6
51	39	married	12	Transport/Comm/Utility	9.73	38	20.7
52	41	single	6	Business/Repair Svc	2.90	37	0.8
53	39	single	12	Professional Services	10.06	40	19.8
54	36	married	12	Finance/Ins/Real Estate	8.52	40	19.0
55	43	single	12	Professional Services	8.49	37	10.2
56	43	married	12	Manufacturing	5.60	40	0.7
57	41	single	12	Professional Services	4.23	38	0.3
58	36	single	10	Manufacturing	5.62	43	2.7
59	42	married	12	Public Administration	4.65	30	1.5
60	36	married	17	Professional Services	15.48	30	9.8
61	44	single	9	Professional Services	4.83	35	8.5
62	43	single	14	Professional Services	40.20	40	1.2
63	43	married	18	Professional Services	15.48	40	5.8
64	37	married	15	Professional Services	10.03	40	0.6
65	43	married	10	Ag/Forestry/Fisheries	3.62	40	0.3
66	40	married	12	Ag/Forestry/Fisheries	9.30	20	3.1
67	37	married	18	Professional Services	10.22	50	4.8
68	36	married	11	Finance/Ins/Real Estate	10.01	37	17.3
69	38	married	14	Professional Services	4.23	4	1.1
70	37	married	13	Construction	4.83	25	7.5

idcode	age	married	educ	industry	wage	hours	tenure
71	41	married	17	Professional Services	7.75	40	3.8
72	36	single	16	Professional Services	9.85	37	14.8
73	44	married	15	Professional Services	10.87	30	3.4
74	43	single	12	Personal Services	3.22	35	2.9
75	38	single	12	Public Administration	8.16	40	3.5
76	43	single	12	Manufacturing	8.45	40	13.3
77	41	married	12	Professional Services	8.29	40	12.1
78	41	married	12	Manufacturing	9.68	40	8.4
79	36	married	12	Ag/Forestry/Fisheries	4.53	40	2.2
80	36	single	14	Wholesale/Retail Trade	3.34	30	0.3
81	41	married	11	Finance/Ins/Real Estate	8.45	24	3.2
82	38	married	10	Wholesale/Retail Trade	6.04	40	4.0
83	37	married	14	Professional Services	10.32	18	1.3
84	38	single	18	Professional Services	11.61	50	2.1
85	37	single	11	Manufacturing	5.02	40	10.9
86	43	single	10	Manufacturing	6.44	40	14.4
87	36	single	16	Wholesale/Retail Trade	5.03	40	3.8
88	35	married	12	Professional Services	4.83	38	2.1
89	35	single	13	Professional Services	11.07	40	8.9
90	40	married	16	Manufacturing	8.32	35	1.8
91	37	single	16	Entertainment/Rec Svc	13.08	40	8.8
92	38	married	13	Professional Services	5.63	40	4.7
93	35	single	16	Manufacturing	12.56	45	15.8
94	34	married	16	Public Administration	6.68	40	6.7
95	42	single	15	Manufacturing	5.64	40	1.3
96	42	married	16	Finance/Ins/Real Estate	4.03	15	0.3
97	42	married	16	Business/Repair Svc	18.07	30	9.8
98	36	married	16	Professional Services	5.81	40	13.9
99	36	married	18	Professional Services	24.66	20	3.8
100	36	single	17	Professional Services	7.21	40	1.8
101	39	married	12	Professional Services	4.69	24	8.8
102	35	married	18	Public Administration	12.70	40	8.6
103	36	single	13	Finance/Ins/Real Estate	9.57	40	11.3
104	36	married	15	Professional Services	6.19	40	1.0
105	44	married	18	Professional Services	7.68	50	3.9
106	39	single	12	Professional Services	9.81	40	9.8
107	45	married	14	Transport/Comm/Utility	4.03	40	24.8
108	38	married	16	Professional Services	11.61	40	2.8
109	38	single	12	Professional Services	6.96	40	2.5
110	41	married	12	Professional Services	4.26	40	2.8
111	44	single	14	Professional Services	4.51	40	1.3
112	44	single	14	Professional Services	9.23	40	0.8

idcode	age	married	educ	industry	wage	hours	tenure
113	40	married	16	Professional Services	3.32	14	1.8
114	38	married	16	Professional Services	8.05	40	10.7
115	36	single	11	Wholesale/Retail Trade	5.11	40	11.3
116	42	married	12	Business/Repair Svc	3.55	20	0.3
117	38	married	10	Manufacturing	1.00	16	1.0
118	35	married	12	Wholesale/Retail Trade	7.32	22	16.2
119	35	married	16	Wholesale/Retail Trade	9.89	55	6.3
120	38	married	13	Wholesale/Retail Trade	5.89	50	2.6
121	41	married	12	Professional Services	4.86	15	0.8
122	44	married	12	Construction	2.80	46	0.8
123	42	single	12	Professional Services	3.05	40	4.6
124	34	married	12	Wholesale/Retail Trade	5.64	30	1.8
125	44	married	12	Professional Services	8.81	32	11.4
126	37	married	16	Finance/Ins/Real Estate	23.24	40	2.3
127	41	single	16	Finance/Ins/Real Estate	12.22	38	6.8
128	38	single	18	Professional Services	12.97	40	6.5
129	40	married	16	Professional Services	15.79	40	15.5
130	37	married	14	Professional Services	6.96	40	13.4
131	35	single	12	Wholesale/Retail Trade	4.39	22	2.3
132	37	married	18	Professional Services	11.15	50	0.8
133	36	married	15	Professional Services	9.66	16	0.7
134	38	single	16	Finance/Ins/Real Estate	29.73	50	1.5
135	45	married	12	Professional Services	4.49	18	2.7
136	41	single	14	Wholesale/Retail Trade	6.69	16	0.8
137	44	married	12	Wholesale/Retail Trade	5.85	25	0.9
138	34	single	12	Transport/Comm/Utility	4.61	60	3.3
139	38	single	9	Business/Repair Svc	4.03	30	
140	42	single	14	Professional Services	12.18	40	2.5
141	43	single	16	Professional Services	4.75	40	0.7
142	37	single	15	Manufacturing	8.05	40	12.4
143	36	single	9	Manufacturing	7.45	40	4.8
144	35	married	16	Professional Services	8.52	40	11.5
145	41	married	14	Professional Services	7.25	18	1.3
146	41	married	14	Wholesale/Retail Trade	11.97	40	6.2
147	45	married	12	Professional Services	8.81	32	5.1
148	36	married	14	Finance/Ins/Real Estate	11.07	40	17.0
149	39	married	14	Professional Services	9.68	40	2.4
150	35	married	13	Finance/Ins/Real Estate	3.54	20	14.2
151	36	single	12	Wholesale/Retail Trade	4.42	35	2.5
152	43	married	16	Business/Repair Svc	7.32	40	9.8
153	45	married	12	Finance/Ins/Real Estate	8.05	40	17.4
154	44	married	14	Professional Services	10.84	40	6.0

idcode	age	married	educ	industry	wage	hours	tenure
155	37	married	12	Manufacturing	38.71	40	10.8
156	41	single	12	Manufacturing	9.90	36	9.3
157	37	married	13	Professional Services	10.35	35	8.1
158	41	single	12	Manufacturing	11.51	42	17.5
159	38	married	16	Finance/Ins/Real Estate	23.82	65	3.8
160	43	single	13	Wholesale/Retail Trade	7.55	40	20.2
161	42	single	12	Public Administration	7.96	35	1.6
162	41	married	13	Professional Services	4.83	25	
163	40	married	14	Professional Services	5.47	15	0.1
164	43	married	8	Manufacturing	8.05	40	2.8
165	36	single	16	Manufacturing	6.55	40	13.8
166	37	married	14	Professional Services	3.26	32	1.9
167	37	married	13	Manufacturing	4.83	20	0.8
168	35	married	16	Wholesale/Retail Trade	8.41	40	6.4
169	37	married	16	Manufacturing	16.53	40	0.0
170	36	married	12	Manufacturing	6.18	40	9.3
171	40	single	12	Public Administration	5.73	40	10.5
172	36	married	12	Manufacturing	6.28	40	0.5
173	37	married	18	Professional Services	1.03	15	4.6
174	36	married	14	Professional Services	5.96	26	1.7
175	43	single	14	Professional Services	10.19	42	2.5
176	36	married	16	Finance/Ins/Real Estate	5.52	39	5.5
177	35	single	15	Professional Services	5.79	50	3.3
178	34	married	12	Personal Services	3.34	20	0.2
179	36	married	12	Manufacturing	6.28	40	2.3
180	36	single	11	Personal Services	1.72	35	7.2
181	42	single	12	Personal Services	3.49	30	5.2
182	34	single	12	Manufacturing	3.64	40	1.0
183	40	married	12	Wholesale/Retail Trade	2.68	30	0.4
184	43	married	13	Professional Services	7.75	40	3.1
185	36	single	16	Public Administration	11.41	38	8.3
186	37	married	12	Manufacturing	7.04	55	6.8
187	43	married	13	Finance/Ins/Real Estate	6.66	40	1.8
188	34	single	12	Personal Services	3.05	30	1.2
189	37	married	12	Public Administration	7.85	40	18.3
190	37	married	11	Finance/Ins/Real Estate	8.15	38	2.8
191	42	married	9	Personal Services	7.25	16	0.1
192	37	married	13	Wholesale/Retail Trade	5.64	20	1.8
193	39	married	12	Professional Services	11.05	37	4.0
194	38	single	16	Wholesale/Retail Trade	11.63	45	4.2
195	45	married	14	Professional Services	8.62	42	6.9
196	39	married	14	Professional Services	11.25	20	10.8

idcode	age	married	educ	industry	wage	hours	tenure
197	40	single	10	Wholesale/Retail Trade	5.24	43	5.8
198	39	married	13	Personal Services	9.20	7	2.0
199	36	married	12	Wholesale/Retail Trade	3.76	30	0.3
200	38	married	14	Finance/Ins/Real Estate	35.73	45	2.3
201	38	single	8	Professional Services	5.85	30	9.7
202	42	married	13	Ag/Forestry/Fisheries	3.10	3	1.5
203	41	single	14	Public Administration	7.24	40	8.3
204	35	single	11	Public Administration	6.77	48	9.9
205	35	married	12	Wholesale/Retail Trade	2.86	20	1.6
206	42	married	12	Wholesale/Retail Trade	3.10	30	2.3
207	38	married	12	Professional Services	6.59	32	1.8
208	37	married	12	Professional Services	8.29	38	7.3
209	42	married	12	Wholesale/Retail Trade	5.03	40	3.0
210	35	married	17	Professional Services	3.62	40	0.1
211	38	single	18	Professional Services	11.07	40	6.8
212	36	single	12	Personal Services	6.65	22	2.1
213	43	married	16	Wholesale/Retail Trade	12.38	25	1.0
214	39	married	12	Transport/Comm/Utility	7.25	50	3.9
215	38	married	16	Professional Services	8.60	45	13.7
216	40	married	12	Professional Services	12.85	40	11.8
217	38	single	10	Construction	4.11	40	0.3
218	43	married	16	Professional Services	10.32	60	14.4
219	36	married	14	Professional Services	6.03	18	18.6
220	39	married	12	Professional Services	38.71	40	5.8
221	35	married	12	Public Administration	7.53	40	7.5
222	35	married	12	Professional Services	3.57	40	6.9
223	43	married	12	Wholesale/Retail Trade	6.81	40	16.9
224	36	married	12	Professional Services	6.34	40	5.7
225	39	single	7	Manufacturing	5.90	40	1.0
226	41	married	14	Professional Services	5.45	40	6.9
227	38	married	12	Professional Services	5.29	20	1.0
228	38	married	12	Public Administration	7.27	35	3.2
229	40	single	16	Finance/Ins/Real Estate	1.55	50	1.2
230	35	married	16	Professional Services	5.61	40	3.8
231	45	single	12	Wholesale/Retail Trade	3.55	12	0.6
232	42	married	9	Wholesale/Retail Trade	3.45	35	4.2
233	38	single	13	Finance/Ins/Real Estate	22.52	55	13.4
234	41	single	6	Personal Services	4.43	40	1.3
235	38	married	12	Professional Services	4.78	35	1.6
236	43	single	12	Construction	6.28	30	0.3
237	36	married	16	Professional Services	9.66	24	3.1
238	36	married	12	Business/Repair Svc	12.58	40	1.3

idcode	age	married	educ	industry	wage	hours	tenure
239	42	single	12	Professional Services	4.18	40	1.4
240	44	married	12	Wholesale/Retail Trade	8.37	37	1.4
241	36	single	16	Manufacturing	20.79	35	10.3
242	35	single	14	Professional Services	7.99	38	6.3
243	36	single	11	Personal Services	2.52	24	3.0
244	42	single	12	Public Administration	11.06	35	3.6
245	43	single	12	Professional Services	9.68	40	1.3
246	45	married	16	Professional Services	8.90	40	2.1
247	40	married	12	Finance/Ins/Real Estate	4.21	35	1.6