

```

import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import classification_report, confusion_matrix
from sklearn.decomposition import PCA
import matplotlib.pyplot as plt
from sklearn.manifold import TSNE

```

1. Wczytanie zbioru danych

```

df = pd.read_csv('diabetes.csv')
print(df.to_string())

```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI
DiabetesPedigreeFunction	Age	Outcome				
0	6	148	72	35	0	33.6
0.627	50	1				
1	1	85	66	29	0	26.6
0.351	31	0				
2	8	183	64	0	0	23.3
0.672	32	1				
3	1	89	66	23	94	28.1
0.167	21	0				
4	0	137	40	35	168	43.1
2.288	33	1				
5	5	116	74	0	0	25.6
0.201	30	0				
6	3	78	50	32	88	31.0
0.248	26	1				
7	10	115	0	0	0	35.3
0.134	29	0				
8	2	197	70	45	543	30.5
0.158	53	1				
9	8	125	96	0	0	0.0
0.232	54	1				
10	4	110	92	0	0	37.6
0.191	30	0				
11	10	168	74	0	0	38.0
0.537	34	1				
12	10	139	80	0	0	27.1
1.441	57	0				
13	1	189	60	23	846	30.1
0.398	59	1				
14	5	166	72	19	175	25.8
0.587	51	1				
15	7	100	0	0	0	30.0
0.484	32	1				
16	0	118	84	47	230	45.8

0.551	31		1					
17		7		107	74	0	0	29.6
0.254	31		1					
18		1		103	30	38	83	43.3
0.183	33		0					
19		1		115	70	30	96	34.6
0.529	32		1					
20		3		126	88	41	235	39.3
0.704	27		0					
21		8		99	84	0	0	35.4
0.388	50		0					
22		7		196	90	0	0	39.8
0.451	41		1					
23		9		119	80	35	0	29.0
0.263	29		1					
24		11		143	94	33	146	36.6
0.254	51		1					
25		10		125	70	26	115	31.1
0.205	41		1					
26		7		147	76	0	0	39.4
0.257	43		1					
27		1		97	66	15	140	23.2
0.487	22		0					
28		13		145	82	19	110	22.2
0.245	57		0					
29		5		117	92	0	0	34.1
0.337	38		0					
30		5		109	75	26	0	36.0
0.546	60		0					
31		3		158	76	36	245	31.6
0.851	28		1					
32		3		88	58	11	54	24.8
0.267	22		0					
33		6		92	92	0	0	19.9
0.188	28		0					
34		10		122	78	31	0	27.6
0.512	45		0					
35		4		103	60	33	192	24.0
0.966	33		0					
36		11		138	76	0	0	33.2
0.420	35		0					
37		9		102	76	37	0	32.9
0.665	46		1					
38		2		90	68	42	0	38.2
0.503	27		1					
39		4		111	72	47	207	37.1
1.390	56		1					
40		3		180	64	25	70	34.0
0.271	26		0					

41		7	133	84	0	0	40.2
0.696	37	0					
42		7	106	92	18	0	22.7
0.235	48	0					
43		9	171	110	24	240	45.4
0.721	54	1					
44		7	159	64	0	0	27.4
0.294	40	0					
45		0	180	66	39	0	42.0
1.893	25	1					
46		1	146	56	0	0	29.7
0.564	29	0					
47		2	71	70	27	0	28.0
0.586	22	0					
48		7	103	66	32	0	39.1
0.344	31	1					
49		7	105	0	0	0	0.0
0.305	24	0					
50		1	103	80	11	82	19.4
0.491	22	0					
51		1	101	50	15	36	24.2
0.526	26	0					
52		5	88	66	21	23	24.4
0.342	30	0					
53		8	176	90	34	300	33.7
0.467	58	1					
54		7	150	66	42	342	34.7
0.718	42	0					
55		1	73	50	10	0	23.0
0.248	21	0					
56		7	187	68	39	304	37.7
0.254	41	1					
57		0	100	88	60	110	46.8
0.962	31	0					
58		0	146	82	0	0	40.5
1.781	44	0					
59		0	105	64	41	142	41.5
0.173	22	0					
60		2	84	0	0	0	0.0
0.304	21	0					
61		8	133	72	0	0	32.9
0.270	39	1					
62		5	44	62	0	0	25.0
0.587	36	0					
63		2	141	58	34	128	25.4
0.699	24	0					
64		7	114	66	0	0	32.8
0.258	42	1					
65		5	99	74	27	0	29.0

0.203	32		0						
66		0		109		88		30	0 32.5
0.855	38		1						
67		2		109		92		0	0 42.7
0.845	54		0						
68		1		95		66		13	38 19.6
0.334	25		0						
69		4		146		85		27	100 28.9
0.189	27		0						
70		2		100		66		20	90 32.9
0.867	28		1						
71		5		139		64		35	140 28.6
0.411	26		0						
72		13		126		90		0	0 43.4
0.583	42		1						
73		4		129		86		20	270 35.1
0.231	23		0						
74		1		79		75		30	0 32.0
0.396	22		0						
75		1		0		48		20	0 24.7
0.140	22		0						
76		7		62		78		0	0 32.6
0.391	41		0						
77		5		95		72		33	0 37.7
0.370	27		0						
78		0		131		0		0	0 43.2
0.270	26		1						
79		2		112		66		22	0 25.0
0.307	24		0						
80		3		113		44		13	0 22.4
0.140	22		0						
81		2		74		0		0	0 0.0
0.102	22		0						
82		7		83		78		26	71 29.3
0.767	36		0						
83		0		101		65		28	0 24.6
0.237	22		0						
84		5		137		108		0	0 48.8
0.227	37		1						
85		2		110		74		29	125 32.4
0.698	27		0						
86		13		106		72		54	0 36.6
0.178	45		0						
87		2		100		68		25	71 38.5
0.324	26		0						
88		15		136		70		32	110 37.1
0.153	43		1						
89		1		107		68		19	0 26.5
0.165	24		0						

90		1	80	55	0	0	19.1
0.258	21	0					
91		4	123	80	15	176	32.0
0.443	34	0					
92		7	81	78	40	48	46.7
0.261	42	0					
93		4	134	72	0	0	23.8
0.277	60	1					
94		2	142	82	18	64	24.7
0.761	21	0					
95		6	144	72	27	228	33.9
0.255	40	0					
96		2	92	62	28	0	31.6
0.130	24	0					
97		1	71	48	18	76	20.4
0.323	22	0					
98		6	93	50	30	64	28.7
0.356	23	0					
99		1	122	90	51	220	49.7
0.325	31	1					
100		1	163	72	0	0	39.0
1.222	33	1					
101		1	151	60	0	0	26.1
0.179	22	0					
102		0	125	96	0	0	22.5
0.262	21	0					
103		1	81	72	18	40	26.6
0.283	24	0					
104		2	85	65	0	0	39.6
0.930	27	0					
105		1	126	56	29	152	28.7
0.801	21	0					
106		1	96	122	0	0	22.4
0.207	27	0					
107		4	144	58	28	140	29.5
0.287	37	0					
108		3	83	58	31	18	34.3
0.336	25	0					
109		0	95	85	25	36	37.4
0.247	24	1					
110		3	171	72	33	135	33.3
0.199	24	1					
111		8	155	62	26	495	34.0
0.543	46	1					
112		1	89	76	34	37	31.2
0.192	23	0					
113		4	76	62	0	0	34.0
0.391	25	0					
114		7	160	54	32	175	30.5

0.588	39		1					
115		4		146	92	0	0	31.2
0.539	61		1					
116		5		124	74	0	0	34.0
0.220	38		1					
117		5		78	48	0	0	33.7
0.654	25		0					
118		4		97	60	23	0	28.2
0.443	22		0					
119		4		99	76	15	51	23.2
0.223	21		0					
120		0		162	76	56	100	53.2
0.759	25		1					
121		6		111	64	39	0	34.2
0.260	24		0					
122		2		107	74	30	100	33.6
0.404	23		0					
123		5		132	80	0	0	26.8
0.186	69		0					
124		0		113	76	0	0	33.3
0.278	23		1					
125		1		88	30	42	99	55.0
0.496	26		1					
126		3		120	70	30	135	42.9
0.452	30		0					
127		1		118	58	36	94	33.3
0.261	23		0					
128		1		117	88	24	145	34.5
0.403	40		1					
129		0		105	84	0	0	27.9
0.741	62		1					
130		4		173	70	14	168	29.7
0.361	33		1					
131		9		122	56	0	0	33.3
1.114	33		1					
132		3		170	64	37	225	34.5
0.356	30		1					
133		8		84	74	31	0	38.3
0.457	39		0					
134		2		96	68	13	49	21.1
0.647	26		0					
135		2		125	60	20	140	33.8
0.088	31		0					
136		0		100	70	26	50	30.8
0.597	21		0					
137		0		93	60	25	92	28.7
0.532	22		0					
138		0		129	80	0	0	31.2
0.703	29		0					

139		5		105	72	29	325	36.9
0.159	28		0					
140		3		128	78	0	0	21.1
0.268	55		0					
141		5		106	82	30	0	39.5
0.286	38		0					
142		2		108	52	26	63	32.5
0.318	22		0					
143		10		108	66	0	0	32.4
0.272	42		1					
144		4		154	62	31	284	32.8
0.237	23		0					
145		0		102	75	23	0	0.0
0.572	21		0					
146		9		57	80	37	0	32.8
0.096	41		0					
147		2		106	64	35	119	30.5
1.400	34		0					
148		5		147	78	0	0	33.7
0.218	65		0					
149		2		90	70	17	0	27.3
0.085	22		0					
150		1		136	74	50	204	37.4
0.399	24		0					
151		4		114	65	0	0	21.9
0.432	37		0					
152		9		156	86	28	155	34.3
1.189	42		1					
153		1		153	82	42	485	40.6
0.687	23		0					
154		8		188	78	0	0	47.9
0.137	43		1					
155		7		152	88	44	0	50.0
0.337	36		1					
156		2		99	52	15	94	24.6
0.637	21		0					
157		1		109	56	21	135	25.2
0.833	23		0					
158		2		88	74	19	53	29.0
0.229	22		0					
159		17		163	72	41	114	40.9
0.817	47		1					
160		4		151	90	38	0	29.7
0.294	36		0					
161		7		102	74	40	105	37.2
0.204	45		0					
162		0		114	80	34	285	44.2
0.167	27		0					
163		2		100	64	23	0	29.7

0.368	21	0	0					
164		0		131	88	0	0	31.6
0.743	32		1					
165		6		104	74	18	156	29.9
0.722	41		1					
166		3		148	66	25	0	32.5
0.256	22		0					
167		4		120	68	0	0	29.6
0.709	34		0					
168		4		110	66	0	0	31.9
0.471	29		0					
169		3		111	90	12	78	28.4
0.495	29		0					
170		6		102	82	0	0	30.8
0.180	36		1					
171		6		134	70	23	130	35.4
0.542	29		1					
172		2		87	0	23	0	28.9
0.773	25		0					
173		1		79	60	42	48	43.5
0.678	23		0					
174		2		75	64	24	55	29.7
0.370	33		0					
175		8		179	72	42	130	32.7
0.719	36		1					
176		6		85	78	0	0	31.2
0.382	42		0					
177		0		129	110	46	130	67.1
0.319	26		1					
178		5		143	78	0	0	45.0
0.190	47		0					
179		5		130	82	0	0	39.1
0.956	37		1					
180		6		87	80	0	0	23.2
0.084	32		0					
181		0		119	64	18	92	34.9
0.725	23		0					
182		1		0	74	20	23	27.7
0.299	21		0					
183		5		73	60	0	0	26.8
0.268	27		0					
184		4		141	74	0	0	27.6
0.244	40		0					
185		7		194	68	28	0	35.9
0.745	41		1					
186		8		181	68	36	495	30.1
0.615	60		1					
187		1		128	98	41	58	32.0
1.321	33		1					

188		8		109	76	39	114	27.9
0.640	31		1					
189		5		139	80	35	160	31.6
0.361	25		1					
190		3		111	62	0	0	22.6
0.142	21		0					
191		9		123	70	44	94	33.1
0.374	40		0					
192		7		159	66	0	0	30.4
0.383	36		1					
193		11		135	0	0	0	52.3
0.578	40		1					
194		8		85	55	20	0	24.4
0.136	42		0					
195		5		158	84	41	210	39.4
0.395	29		1					
196		1		105	58	0	0	24.3
0.187	21		0					
197		3		107	62	13	48	22.9
0.678	23		1					
198		4		109	64	44	99	34.8
0.905	26		1					
199		4		148	60	27	318	30.9
0.150	29		1					
200		0		113	80	16	0	31.0
0.874	21		0					
201		1		138	82	0	0	40.1
0.236	28		0					
202		0		108	68	20	0	27.3
0.787	32		0					
203		2		99	70	16	44	20.4
0.235	27		0					
204		6		103	72	32	190	37.7
0.324	55		0					
205		5		111	72	28	0	23.9
0.407	27		0					
206		8		196	76	29	280	37.5
0.605	57		1					
207		5		162	104	0	0	37.7
0.151	52		1					
208		1		96	64	27	87	33.2
0.289	21		0					
209		7		184	84	33	0	35.5
0.355	41		1					
210		2		81	60	22	0	27.7
0.290	25		0					
211		0		147	85	54	0	42.8
0.375	24		0					
212		7		179	95	31	0	34.2

0.164	60		0						
213		0		140	65	26	130	42.6	
0.431	24		1						
214		9		112	82	32	175	34.2	
0.260	36		1						
215		12		151	70	40	271	41.8	
0.742	38		1						
216		5		109	62	41	129	35.8	
0.514	25		1						
217		6		125	68	30	120	30.0	
0.464	32		0						
218		5		85	74	22	0	29.0	
1.224	32		1						
219		5		112	66	0	0	37.8	
0.261	41		1						
220		0		177	60	29	478	34.6	
1.072	21		1						
221		2		158	90	0	0	31.6	
0.805	66		1						
222		7		119	0	0	0	25.2	
0.209	37		0						
223		7		142	60	33	190	28.8	
0.687	61		0						
224		1		100	66	15	56	23.6	
0.666	26		0						
225		1		87	78	27	32	34.6	
0.101	22		0						
226		0		101	76	0	0	35.7	
0.198	26		0						
227		3		162	52	38	0	37.2	
0.652	24		1						
228		4		197	70	39	744	36.7	
2.329	31		0						
229		0		117	80	31	53	45.2	
0.089	24		0						
230		4		142	86	0	0	44.0	
0.645	22		1						
231		6		134	80	37	370	46.2	
0.238	46		1						
232		1		79	80	25	37	25.4	
0.583	22		0						
233		4		122	68	0	0	35.0	
0.394	29		0						
234		3		74	68	28	45	29.7	
0.293	23		0						
235		4		171	72	0	0	43.6	
0.479	26		1						
236		7		181	84	21	192	35.9	
0.586	51		1						

237		0		179	90	27	0	44.1
0.686	23		1					
238		9		164	84	21	0	30.8
0.831	32		1					
239		0		104	76	0	0	18.4
0.582	27		0					
240		1		91	64	24	0	29.2
0.192	21		0					
241		4		91	70	32	88	33.1
0.446	22		0					
242		3		139	54	0	0	25.6
0.402	22		1					
243		6		119	50	22	176	27.1
1.318	33		1					
244		2		146	76	35	194	38.2
0.329	29		0					
245		9		184	85	15	0	30.0
1.213	49		1					
246		10		122	68	0	0	31.2
0.258	41		0					
247		0		165	90	33	680	52.3
0.427	23		0					
248		9		124	70	33	402	35.4
0.282	34		0					
249		1		111	86	19	0	30.1
0.143	23		0					
250		9		106	52	0	0	31.2
0.380	42		0					
251		2		129	84	0	0	28.0
0.284	27		0					
252		2		90	80	14	55	24.4
0.249	24		0					
253		0		86	68	32	0	35.8
0.238	25		0					
254		12		92	62	7	258	27.6
0.926	44		1					
255		1		113	64	35	0	33.6
0.543	21		1					
256		3		111	56	39	0	30.1
0.557	30		0					
257		2		114	68	22	0	28.7
0.092	25		0					
258		1		193	50	16	375	25.9
0.655	24		0					
259		11		155	76	28	150	33.3
1.353	51		1					
260		3		191	68	15	130	30.9
0.299	34		0					
261		3		141	0	0	0	30.0
0.761	27		1					

262		4		95	70	32	0	32.1
0.612	24		0					
263		3		142	80	15	0	32.4
0.200	63		0					
264		4		123	62	0	0	32.0
0.226	35		1					
265		5		96	74	18	67	33.6
0.997	43		0					
266		0		138	0	0	0	36.3
0.933	25		1					
267		2		128	64	42	0	40.0
1.101	24		0					
268		0		102	52	0	0	25.1
0.078	21		0					
269		2		146	0	0	0	27.5
0.240	28		1					
270		10		101	86	37	0	45.6
1.136	38		1					
271		2		108	62	32	56	25.2
0.128	21		0					
272		3		122	78	0	0	23.0
0.254	40		0					
273		1		71	78	50	45	33.2
0.422	21		0					
274		13		106	70	0	0	34.2
0.251	52		0					
275		2		100	70	52	57	40.5
0.677	25		0					
276		7		106	60	24	0	26.5
0.296	29		1					
277		0		104	64	23	116	27.8
0.454	23		0					
278		5		114	74	0	0	24.9
0.744	57		0					
279		2		108	62	10	278	25.3
0.881	22		0					
280		0		146	70	0	0	37.9
0.334	28		1					
281		10		129	76	28	122	35.9
0.280	39		0					
282		7		133	88	15	155	32.4
0.262	37		0					
283		7		161	86	0	0	30.4
0.165	47		1					
284		2		108	80	0	0	27.0
0.259	52		1					
285		7		136	74	26	135	26.0
0.647	51		0					
286		5		155	84	44	545	38.7

0.619	34		0						
287		1		119	86	39	220	45.6	
0.808	29		1						
288		4		96	56	17	49	20.8	
0.340	26		0						
289		5		108	72	43	75	36.1	
0.263	33		0						
290		0		78	88	29	40	36.9	
0.434	21		0						
291		0		107	62	30	74	36.6	
0.757	25		1						
292		2		128	78	37	182	43.3	
1.224	31		1						
293		1		128	48	45	194	40.5	
0.613	24		1						
294		0		161	50	0	0	21.9	
0.254	65		0						
295		6		151	62	31	120	35.5	
0.692	28		0						
296		2		146	70	38	360	28.0	
0.337	29		1						
297		0		126	84	29	215	30.7	
0.520	24		0						
298		14		100	78	25	184	36.6	
0.412	46		1						
299		8		112	72	0	0	23.6	
0.840	58		0						
300		0		167	0	0	0	32.3	
0.839	30		1						
301		2		144	58	33	135	31.6	
0.422	25		1						
302		5		77	82	41	42	35.8	
0.156	35		0						
303		5		115	98	0	0	52.9	
0.209	28		1						
304		3		150	76	0	0	21.0	
0.207	37		0						
305		2		120	76	37	105	39.7	
0.215	29		0						
306		10		161	68	23	132	25.5	
0.326	47		1						
307		0		137	68	14	148	24.8	
0.143	21		0						
308		0		128	68	19	180	30.5	
1.391	25		1						
309		2		124	68	28	205	32.9	
0.875	30		1						
310		6		80	66	30	0	26.2	
0.313	41		0						

311		0	106	70	37	148	39.4
0.605	22	0					
312		2	155	74	17	96	26.6
0.433	27	1					
313		3	113	50	10	85	29.5
0.626	25	0					
314		7	109	80	31	0	35.9
1.127	43	1					
315		2	112	68	22	94	34.1
0.315	26	0					
316		3	99	80	11	64	19.3
0.284	30	0					
317		3	182	74	0	0	30.5
0.345	29	1					
318		3	115	66	39	140	38.1
0.150	28	0					
319		6	194	78	0	0	23.5
0.129	59	1					
320		4	129	60	12	231	27.5
0.527	31	0					
321		3	112	74	30	0	31.6
0.197	25	1					
322		0	124	70	20	0	27.4
0.254	36	1					
323		13	152	90	33	29	26.8
0.731	43	1					
324		2	112	75	32	0	35.7
0.148	21	0					
325		1	157	72	21	168	25.6
0.123	24	0					
326		1	122	64	32	156	35.1
0.692	30	1					
327		10	179	70	0	0	35.1
0.200	37	0					
328		2	102	86	36	120	45.5
0.127	23	1					
329		6	105	70	32	68	30.8
0.122	37	0					
330		8	118	72	19	0	23.1
1.476	46	0					
331		2	87	58	16	52	32.7
0.166	25	0					
332		1	180	0	0	0	43.3
0.282	41	1					
333		12	106	80	0	0	23.6
0.137	44	0					
334		1	95	60	18	58	23.9
0.260	22	0					
335		0	165	76	43	255	47.9

0.259	26		0						
336		0		117		0		0	33.8
0.932	44		0						
337		5		115		76		0	31.2
0.343	44		1						
338		9		152		78		34	34.2
0.893	33		1						
339		7		178		84		0	39.9
0.331	41		1						
340		1		130		70		13	25.9
0.472	22		0						
341		1		95		74		21	25.9
0.673	36		0						
342		1		0		68		35	32.0
0.389	22		0						
343		5		122		86		0	34.7
0.290	33		0						
344		8		95		72		0	36.8
0.485	57		0						
345		8		126		88		36	38.5
0.349	49		0						
346		1		139		46		19	28.7
0.654	22		0						
347		3		116		0		0	23.5
0.187	23		0						
348		3		99		62		19	21.8
0.279	26		0						
349		5		0		80		32	41.0
0.346	37		1						
350		4		92		80		0	42.2
0.237	29		0						
351		4		137		84		0	31.2
0.252	30		0						
352		3		61		82		28	34.4
0.243	46		0						
353		1		90		62		12	27.2
0.580	24		0						
354		3		90		78		0	42.7
0.559	21		0						
355		9		165		88		0	30.4
0.302	49		1						
356		1		125		50		40	33.3
0.962	28		1						
357		13		129		0		30	39.9
0.569	44		1						
358		12		88		74		40	35.3
0.378	48		0						
359		1		196		76		36	36.5
0.875	29		1						

360		5		189	64	33	325	31.2
0.583	29		1					
361		5		158	70	0	0	29.8
0.207	63		0					
362		5		103	108	37	0	39.2
0.305	65		0					
363		4		146	78	0	0	38.5
0.520	67		1					
364		4		147	74	25	293	34.9
0.385	30		0					
365		5		99	54	28	83	34.0
0.499	30		0					
366		6		124	72	0	0	27.6
0.368	29		1					
367		0		101	64	17	0	21.0
0.252	21		0					
368		3		81	86	16	66	27.5
0.306	22		0					
369		1		133	102	28	140	32.8
0.234	45		1					
370		3		173	82	48	465	38.4
2.137	25		1					
371		0		118	64	23	89	0.0
1.731	21		0					
372		0		84	64	22	66	35.8
0.545	21		0					
373		2		105	58	40	94	34.9
0.225	25		0					
374		2		122	52	43	158	36.2
0.816	28		0					
375		12		140	82	43	325	39.2
0.528	58		1					
376		0		98	82	15	84	25.2
0.299	22		0					
377		1		87	60	37	75	37.2
0.509	22		0					
378		4		156	75	0	0	48.3
0.238	32		1					
379		0		93	100	39	72	43.4
1.021	35		0					
380		1		107	72	30	82	30.8
0.821	24		0					
381		0		105	68	22	0	20.0
0.236	22		0					
382		1		109	60	8	182	25.4
0.947	21		0					
383		1		90	62	18	59	25.1
1.268	25		0					
384		1		125	70	24	110	24.3

0.221	25		0					
385		1		119	54	13	50	22.3
0.205	24		0					
386		5		116	74	29	0	32.3
0.660	35		1					
387		8		105	100	36	0	43.3
0.239	45		1					
388		5		144	82	26	285	32.0
0.452	58		1					
389		3		100	68	23	81	31.6
0.949	28		0					
390		1		100	66	29	196	32.0
0.444	42		0					
391		5		166	76	0	0	45.7
0.340	27		1					
392		1		131	64	14	415	23.7
0.389	21		0					
393		4		116	72	12	87	22.1
0.463	37		0					
394		4		158	78	0	0	32.9
0.803	31		1					
395		2		127	58	24	275	27.7
1.600	25		0					
396		3		96	56	34	115	24.7
0.944	39		0					
397		0		131	66	40	0	34.3
0.196	22		1					
398		3		82	70	0	0	21.1
0.389	25		0					
399		3		193	70	31	0	34.9
0.241	25		1					
400		4		95	64	0	0	32.0
0.161	31		1					
401		6		137	61	0	0	24.2
0.151	55		0					
402		5		136	84	41	88	35.0
0.286	35		1					
403		9		72	78	25	0	31.6
0.280	38		0					
404		5		168	64	0	0	32.9
0.135	41		1					
405		2		123	48	32	165	42.1
0.520	26		0					
406		4		115	72	0	0	28.9
0.376	46		1					
407		0		101	62	0	0	21.9
0.336	25		0					
408		8		197	74	0	0	25.9
1.191	39		1					

409		1		172	68	49	579	42.4
0.702	28		1					
410		6		102	90	39	0	35.7
0.674	28		0					
411		1		112	72	30	176	34.4
0.528	25		0					
412		1		143	84	23	310	42.4
1.076	22		0					
413		1		143	74	22	61	26.2
0.256	21		0					
414		0		138	60	35	167	34.6
0.534	21		1					
415		3		173	84	33	474	35.7
0.258	22		1					
416		1		97	68	21	0	27.2
1.095	22		0					
417		4		144	82	32	0	38.5
0.554	37		1					
418		1		83	68	0	0	18.2
0.624	27		0					
419		3		129	64	29	115	26.4
0.219	28		1					
420		1		119	88	41	170	45.3
0.507	26		0					
421		2		94	68	18	76	26.0
0.561	21		0					
422		0		102	64	46	78	40.6
0.496	21		0					
423		2		115	64	22	0	30.8
0.421	21		0					
424		8		151	78	32	210	42.9
0.516	36		1					
425		4		184	78	39	277	37.0
0.264	31		1					
426		0		94	0	0	0	0.0
0.256	25		0					
427		1		181	64	30	180	34.1
0.328	38		1					
428		0		135	94	46	145	40.6
0.284	26		0					
429		1		95	82	25	180	35.0
0.233	43		1					
430		2		99	0	0	0	22.2
0.108	23		0					
431		3		89	74	16	85	30.4
0.551	38		0					
432		1		80	74	11	60	30.0
0.527	22		0					
433		2		139	75	0	0	25.6

0.167	29		0						
434		1		90	68	8	0	24.5	
1.138	36		0						
435		0		141	0	0	0	42.4	
0.205	29		1						
436		12		140	85	33	0	37.4	
0.244	41		0						
437		5		147	75	0	0	29.9	
0.434	28		0						
438		1		97	70	15	0	18.2	
0.147	21		0						
439		6		107	88	0	0	36.8	
0.727	31		0						
440		0		189	104	25	0	34.3	
0.435	41		1						
441		2		83	66	23	50	32.2	
0.497	22		0						
442		4		117	64	27	120	33.2	
0.230	24		0						
443		8		108	70	0	0	30.5	
0.955	33		1						
444		4		117	62	12	0	29.7	
0.380	30		1						
445		0		180	78	63	14	59.4	
2.420	25		1						
446		1		100	72	12	70	25.3	
0.658	28		0						
447		0		95	80	45	92	36.5	
0.330	26		0						
448		0		104	64	37	64	33.6	
0.510	22		1						
449		0		120	74	18	63	30.5	
0.285	26		0						
450		1		82	64	13	95	21.2	
0.415	23		0						
451		2		134	70	0	0	28.9	
0.542	23		1						
452		0		91	68	32	210	39.9	
0.381	25		0						
453		2		119	0	0	0	19.6	
0.832	72		0						
454		2		100	54	28	105	37.8	
0.498	24		0						
455		14		175	62	30	0	33.6	
0.212	38		1						
456		1		135	54	0	0	26.7	
0.687	62		0						
457		5		86	68	28	71	30.2	
0.364	24		0						

458		10		148	84	48	237	37.6
1.001	51		1					
459		9		134	74	33	60	25.9
0.460	81		0					
460		9		120	72	22	56	20.8
0.733	48		0					
461		1		71	62	0	0	21.8
0.416	26		0					
462		8		74	70	40	49	35.3
0.705	39		0					
463		5		88	78	30	0	27.6
0.258	37		0					
464		10		115	98	0	0	24.0
1.022	34		0					
465		0		124	56	13	105	21.8
0.452	21		0					
466		0		74	52	10	36	27.8
0.269	22		0					
467		0		97	64	36	100	36.8
0.600	25		0					
468		8		120	0	0	0	30.0
0.183	38		1					
469		6		154	78	41	140	46.1
0.571	27		0					
470		1		144	82	40	0	41.3
0.607	28		0					
471		0		137	70	38	0	33.2
0.170	22		0					
472		0		119	66	27	0	38.8
0.259	22		0					
473		7		136	90	0	0	29.9
0.210	50		0					
474		4		114	64	0	0	28.9
0.126	24		0					
475		0		137	84	27	0	27.3
0.231	59		0					
476		2		105	80	45	191	33.7
0.711	29		1					
477		7		114	76	17	110	23.8
0.466	31		0					
478		8		126	74	38	75	25.9
0.162	39		0					
479		4		132	86	31	0	28.0
0.419	63		0					
480		3		158	70	30	328	35.5
0.344	35		1					
481		0		123	88	37	0	35.2
0.197	29		0					
482		4		85	58	22	49	27.8

0.306	28	0	0						
483		0		84		82		31	125 38.2
0.233	23	0	0						
484		0		145		0		0	44.2
0.630	31	0	1						
485		0		135		68		42	250 42.3
0.365	24	0	1						
486		1		139		62		41	480 40.7
0.536	21	0	0						
487		0		173		78		32	265 46.5
1.159	58	0	0						
488		4		99		72		17	0 25.6
0.294	28	0	0						
489		8		194		80		0	0 26.1
0.551	67	0	0						
490		2		83		65		28	66 36.8
0.629	24	0	0						
491		2		89		90		30	0 33.5
0.292	42	0	0						
492		4		99		68		38	0 32.8
0.145	33	0	0						
493		4		125		70		18	122 28.9
1.144	45	1	1						
494		3		80		0		0	0 0.0
0.174	22	0	0						
495		6		166		74		0	0 26.6
0.304	66	0	0						
496		5		110		68		0	0 26.0
0.292	30	0	0						
497		2		81		72		15	76 30.1
0.547	25	0	0						
498		7		195		70		33	145 25.1
0.163	55	1	1						
499		6		154		74		32	193 29.3
0.839	39	0	0						
500		2		117		90		19	71 25.2
0.313	21	0	0						
501		3		84		72		32	0 37.2
0.267	28	0	0						
502		6		0		68		41	0 39.0
0.727	41	1	1						
503		7		94		64		25	79 33.3
0.738	41	0	0						
504		3		96		78		39	0 37.3
0.238	40	0	0						
505		10		75		82		0	0 33.3
0.263	38	0	0						
506		0		180		90		26	90 36.5
0.314	35	1	1						

507		1	130	60	23	170	28.6
0.692	21	0					
508		2	84	50	23	76	30.4
0.968	21	0					
509		8	120	78	0	0	25.0
0.409	64	0					
510		12	84	72	31	0	29.7
0.297	46	1					
511		0	139	62	17	210	22.1
0.207	21	0					
512		9	91	68	0	0	24.2
0.200	58	0					
513		2	91	62	0	0	27.3
0.525	22	0					
514		3	99	54	19	86	25.6
0.154	24	0					
515		3	163	70	18	105	31.6
0.268	28	1					
516		9	145	88	34	165	30.3
0.771	53	1					
517		7	125	86	0	0	37.6
0.304	51	0					
518		13	76	60	0	0	32.8
0.180	41	0					
519		6	129	90	7	326	19.6
0.582	60	0					
520		2	68	70	32	66	25.0
0.187	25	0					
521		3	124	80	33	130	33.2
0.305	26	0					
522		6	114	0	0	0	0.0
0.189	26	0					
523		9	130	70	0	0	34.2
0.652	45	1					
524		3	125	58	0	0	31.6
0.151	24	0					
525		3	87	60	18	0	21.8
0.444	21	0					
526		1	97	64	19	82	18.2
0.299	21	0					
527		3	116	74	15	105	26.3
0.107	24	0					
528		0	117	66	31	188	30.8
0.493	22	0					
529		0	111	65	0	0	24.6
0.660	31	0					
530		2	122	60	18	106	29.8
0.717	22	0					
531		0	107	76	0	0	45.3
0.686	24	0					

532		1		86	66	52	65	41.3
0.917	29		0					
533		6		91	0	0	0	29.8
0.501	31		0					
534		1		77	56	30	56	33.3
1.251	24		0					
535		4		132	0	0	0	32.9
0.302	23		1					
536		0		105	90	0	0	29.6
0.197	46		0					
537		0		57	60	0	0	21.7
0.735	67		0					
538		0		127	80	37	210	36.3
0.804	23		0					
539		3		129	92	49	155	36.4
0.968	32		1					
540		8		100	74	40	215	39.4
0.661	43		1					
541		3		128	72	25	190	32.4
0.549	27		1					
542		10		90	85	32	0	34.9
0.825	56		1					
543		4		84	90	23	56	39.5
0.159	25		0					
544		1		88	78	29	76	32.0
0.365	29		0					
545		8		186	90	35	225	34.5
0.423	37		1					
546		5		187	76	27	207	43.6
1.034	53		1					
547		4		131	68	21	166	33.1
0.160	28		0					
548		1		164	82	43	67	32.8
0.341	50		0					
549		4		189	110	31	0	28.5
0.680	37		0					
550		1		116	70	28	0	27.4
0.204	21		0					
551		3		84	68	30	106	31.9
0.591	25		0					
552		6		114	88	0	0	27.8
0.247	66		0					
553		1		88	62	24	44	29.9
0.422	23		0					
554		1		84	64	23	115	36.9
0.471	28		0					
555		7		124	70	33	215	25.5
0.161	37		0					
556		1		97	70	40	0	38.1

0.218	30	0						
557		8	110	76	0	0	27.8	
0.237	58	0						
558		11	103	68	40	0	46.2	
0.126	42	0						
559		11	85	74	0	0	30.1	
0.300	35	0						
560		6	125	76	0	0	33.8	
0.121	54	1						
561		0	198	66	32	274	41.3	
0.502	28	1						
562		1	87	68	34	77	37.6	
0.401	24	0						
563		6	99	60	19	54	26.9	
0.497	32	0						
564		0	91	80	0	0	32.4	
0.601	27	0						
565		2	95	54	14	88	26.1	
0.748	22	0						
566		1	99	72	30	18	38.6	
0.412	21	0						
567		6	92	62	32	126	32.0	
0.085	46	0						
568		4	154	72	29	126	31.3	
0.338	37	0						
569		0	121	66	30	165	34.3	
0.203	33	1						
570		3	78	70	0	0	32.5	
0.270	39	0						
571		2	130	96	0	0	22.6	
0.268	21	0						
572		3	111	58	31	44	29.5	
0.430	22	0						
573		2	98	60	17	120	34.7	
0.198	22	0						
574		1	143	86	30	330	30.1	
0.892	23	0						
575		1	119	44	47	63	35.5	
0.280	25	0						
576		6	108	44	20	130	24.0	
0.813	35	0						
577		2	118	80	0	0	42.9	
0.693	21	1						
578		10	133	68	0	0	27.0	
0.245	36	0						
579		2	197	70	99	0	34.7	
0.575	62	1						
580		0	151	90	46	0	42.1	
0.371	21	1						

581		6	109	60	27	0	25.0
0.206	27	0					
582		12	121	78	17	0	26.5
0.259	62	0					
583		8	100	76	0	0	38.7
0.190	42	0					
584		8	124	76	24	600	28.7
0.687	52	1					
585		1	93	56	11	0	22.5
0.417	22	0					
586		8	143	66	0	0	34.9
0.129	41	1					
587		6	103	66	0	0	24.3
0.249	29	0					
588		3	176	86	27	156	33.3
1.154	52	1					
589		0	73	0	0	0	21.1
0.342	25	0					
590		11	111	84	40	0	46.8
0.925	45	1					
591		2	112	78	50	140	39.4
0.175	24	0					
592		3	132	80	0	0	34.4
0.402	44	1					
593		2	82	52	22	115	28.5
1.699	25	0					
594		6	123	72	45	230	33.6
0.733	34	0					
595		0	188	82	14	185	32.0
0.682	22	1					
596		0	67	76	0	0	45.3
0.194	46	0					
597		1	89	24	19	25	27.8
0.559	21	0					
598		1	173	74	0	0	36.8
0.088	38	1					
599		1	109	38	18	120	23.1
0.407	26	0					
600		1	108	88	19	0	27.1
0.400	24	0					
601		6	96	0	0	0	23.7
0.190	28	0					
602		1	124	74	36	0	27.8
0.100	30	0					
603		7	150	78	29	126	35.2
0.692	54	1					
604		4	183	0	0	0	28.4
0.212	36	1					
605		1	124	60	32	0	35.8

0.514	21		0						
606		1		181	78	42	293	40.0	
1.258	22		1						
607		1		92	62	25	41	19.5	
0.482	25		0						
608		0		152	82	39	272	41.5	
0.270	27		0						
609		1		111	62	13	182	24.0	
0.138	23		0						
610		3		106	54	21	158	30.9	
0.292	24		0						
611		3		174	58	22	194	32.9	
0.593	36		1						
612		7		168	88	42	321	38.2	
0.787	40		1						
613		6		105	80	28	0	32.5	
0.878	26		0						
614		11		138	74	26	144	36.1	
0.557	50		1						
615		3		106	72	0	0	25.8	
0.207	27		0						
616		6		117	96	0	0	28.7	
0.157	30		0						
617		2		68	62	13	15	20.1	
0.257	23		0						
618		9		112	82	24	0	28.2	
1.282	50		1						
619		0		119	0	0	0	32.4	
0.141	24		1						
620		2		112	86	42	160	38.4	
0.246	28		0						
621		2		92	76	20	0	24.2	
1.698	28		0						
622		6		183	94	0	0	40.8	
1.461	45		0						
623		0		94	70	27	115	43.5	
0.347	21		0						
624		2		108	64	0	0	30.8	
0.158	21		0						
625		4		90	88	47	54	37.7	
0.362	29		0						
626		0		125	68	0	0	24.7	
0.206	21		0						
627		0		132	78	0	0	32.4	
0.393	21		0						
628		5		128	80	0	0	34.6	
0.144	45		0						
629		4		94	65	22	0	24.7	
0.148	21		0						

630		7		114	64	0	0	27.4
0.732	34		1					
631		0		102	78	40	90	34.5
0.238	24		0					
632		2		111	60	0	0	26.2
0.343	23		0					
633		1		128	82	17	183	27.5
0.115	22		0					
634		10		92	62	0	0	25.9
0.167	31		0					
635		13		104	72	0	0	31.2
0.465	38		1					
636		5		104	74	0	0	28.8
0.153	48		0					
637		2		94	76	18	66	31.6
0.649	23		0					
638		7		97	76	32	91	40.9
0.871	32		1					
639		1		100	74	12	46	19.5
0.149	28		0					
640		0		102	86	17	105	29.3
0.695	27		0					
641		4		128	70	0	0	34.3
0.303	24		0					
642		6		147	80	0	0	29.5
0.178	50		1					
643		4		90	0	0	0	28.0
0.610	31		0					
644		3		103	72	30	152	27.6
0.730	27		0					
645		2		157	74	35	440	39.4
0.134	30		0					
646		1		167	74	17	144	23.4
0.447	33		1					
647		0		179	50	36	159	37.8
0.455	22		1					
648		11		136	84	35	130	28.3
0.260	42		1					
649		0		107	60	25	0	26.4
0.133	23		0					
650		1		91	54	25	100	25.2
0.234	23		0					
651		1		117	60	23	106	33.8
0.466	27		0					
652		5		123	74	40	77	34.1
0.269	28		0					
653		2		120	54	0	0	26.8
0.455	27		0					
654		1		106	70	28	135	34.2

0.142	22	0						
655		2	155	52	27	540	38.7	
0.240	25	1						
656		2	101	58	35	90	21.8	
0.155	22	0						
657		1	120	80	48	200	38.9	
1.162	41	0						
658		11	127	106	0	0	39.0	
0.190	51	0						
659		3	80	82	31	70	34.2	
1.292	27	1						
660		10	162	84	0	0	27.7	
0.182	54	0						
661		1	199	76	43	0	42.9	
1.394	22	1						
662		8	167	106	46	231	37.6	
0.165	43	1						
663		9	145	80	46	130	37.9	
0.637	40	1						
664		6	115	60	39	0	33.7	
0.245	40	1						
665		1	112	80	45	132	34.8	
0.217	24	0						
666		4	145	82	18	0	32.5	
0.235	70	1						
667		10	111	70	27	0	27.5	
0.141	40	1						
668		6	98	58	33	190	34.0	
0.430	43	0						
669		9	154	78	30	100	30.9	
0.164	45	0						
670		6	165	68	26	168	33.6	
0.631	49	0						
671		1	99	58	10	0	25.4	
0.551	21	0						
672		10	68	106	23	49	35.5	
0.285	47	0						
673		3	123	100	35	240	57.3	
0.880	22	0						
674		8	91	82	0	0	35.6	
0.587	68	0						
675		6	195	70	0	0	30.9	
0.328	31	1						
676		9	156	86	0	0	24.8	
0.230	53	1						
677		0	93	60	0	0	35.3	
0.263	25	0						
678		3	121	52	0	0	36.0	
0.127	25	1						

679		2		101	58	17	265	24.2
0.614	23		0					
680		2		56	56	28	45	24.2
0.332	22		0					
681		0		162	76	36	0	49.6
0.364	26		1					
682		0		95	64	39	105	44.6
0.366	22		0					
683		4		125	80	0	0	32.3
0.536	27		1					
684		5		136	82	0	0	0.0
0.640	69		0					
685		2		129	74	26	205	33.2
0.591	25		0					
686		3		130	64	0	0	23.1
0.314	22		0					
687		1		107	50	19	0	28.3
0.181	29		0					
688		1		140	74	26	180	24.1
0.828	23		0					
689		1		144	82	46	180	46.1
0.335	46		1					
690		8		107	80	0	0	24.6
0.856	34		0					
691		13		158	114	0	0	42.3
0.257	44		1					
692		2		121	70	32	95	39.1
0.886	23		0					
693		7		129	68	49	125	38.5
0.439	43		1					
694		2		90	60	0	0	23.5
0.191	25		0					
695		7		142	90	24	480	30.4
0.128	43		1					
696		3		169	74	19	125	29.9
0.268	31		1					
697		0		99	0	0	0	25.0
0.253	22		0					
698		4		127	88	11	155	34.5
0.598	28		0					
699		4		118	70	0	0	44.5
0.904	26		0					
700		2		122	76	27	200	35.9
0.483	26		0					
701		6		125	78	31	0	27.6
0.565	49		1					
702		1		168	88	29	0	35.0
0.905	52		1					
703		2		129	0	0	0	38.5

0.304	41		0					
704		4		110	76	20	100	28.4
0.118	27		0					
705		6		80	80	36	0	39.8
0.177	28		0					
706		10		115	0	0	0	0.0
0.261	30		1					
707		2		127	46	21	335	34.4
0.176	22		0					
708		9		164	78	0	0	32.8
0.148	45		1					
709		2		93	64	32	160	38.0
0.674	23		1					
710		3		158	64	13	387	31.2
0.295	24		0					
711		5		126	78	27	22	29.6
0.439	40		0					
712		10		129	62	36	0	41.2
0.441	38		1					
713		0		134	58	20	291	26.4
0.352	21		0					
714		3		102	74	0	0	29.5
0.121	32		0					
715		7		187	50	33	392	33.9
0.826	34		1					
716		3		173	78	39	185	33.8
0.970	31		1					
717		10		94	72	18	0	23.1
0.595	56		0					
718		1		108	60	46	178	35.5
0.415	24		0					
719		5		97	76	27	0	35.6
0.378	52		1					
720		4		83	86	19	0	29.3
0.317	34		0					
721		1		114	66	36	200	38.1
0.289	21		0					
722		1		149	68	29	127	29.3
0.349	42		1					
723		5		117	86	30	105	39.1
0.251	42		0					
724		1		111	94	0	0	32.8
0.265	45		0					
725		4		112	78	40	0	39.4
0.236	38		0					
726		1		116	78	29	180	36.1
0.496	25		0					
727		0		141	84	26	0	32.4
0.433	22		0					

728		2		175	88	0	0	22.9
0.326	22		0					
729		2		92	52	0	0	30.1
0.141	22		0					
730		3		130	78	23	79	28.4
0.323	34		1					
731		8		120	86	0	0	28.4
0.259	22		1					
732		2		174	88	37	120	44.5
0.646	24		1					
733		2		106	56	27	165	29.0
0.426	22		0					
734		2		105	75	0	0	23.3
0.560	53		0					
735		4		95	60	32	0	35.4
0.284	28		0					
736		0		126	86	27	120	27.4
0.515	21		0					
737		8		65	72	23	0	32.0
0.600	42		0					
738		2		99	60	17	160	36.6
0.453	21		0					
739		1		102	74	0	0	39.5
0.293	42		1					
740		11		120	80	37	150	42.3
0.785	48		1					
741		3		102	44	20	94	30.8
0.400	26		0					
742		1		109	58	18	116	28.5
0.219	22		0					
743		9		140	94	0	0	32.7
0.734	45		1					
744		13		153	88	37	140	40.6
1.174	39		0					
745		12		100	84	33	105	30.0
0.488	46		0					
746		1		147	94	41	0	49.3
0.358	27		1					
747		1		81	74	41	57	46.3
1.096	32		0					
748		3		187	70	22	200	36.4
0.408	36		1					
749		6		162	62	0	0	24.3
0.178	50		1					
750		4		136	70	0	0	31.2
1.182	22		1					
751		1		121	78	39	74	39.0
0.261	28		0					
752		3		108	62	24	0	26.0

0.223	25	0	0						
753		0	181	88	44	510	43.3		
0.222	26	1							
754		8	154	78	32	0	32.4		
0.443	45	1							
755		1	128	88	39	110	36.5		
1.057	37	1							
756		7	137	90	41	0	32.0		
0.391	39	0							
757		0	123	72	0	0	36.3		
0.258	52	1							
758		1	106	76	0	0	37.5		
0.197	26	0							
759		6	190	92	0	0	35.5		
0.278	66	1							
760		2	88	58	26	16	28.4		
0.766	22	0							
761		9	170	74	31	0	44.0		
0.403	43	1							
762		9	89	62	0	0	22.5		
0.142	33	0							
763		10	101	76	48	180	32.9		
0.171	63	0							
764		2	122	70	27	0	36.8		
0.340	27	0							
765		5	121	72	23	112	26.2		
0.245	30	0							
766		1	126	60	0	0	30.1		
0.349	47	1							
767		1	93	70	31	0	30.4		
0.315	23	0							

2. Przygotowanie danych

```
X = dane.drop("Outcome", axis=1) # cechy
```

```
y = dane["Outcome"] # etykiety
```

3. Podział na zbiór treningowy i testowy

```
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)
```

4. Normalizacja danych

```
scaler = StandardScaler()
```

```
X_train = scaler.fit_transform(X_train)
```

```
X_test = scaler.transform(X_test)
```

5. Trenowanie klasyfikatorów

Regresja logistyczna

```
log_reg = LogisticRegression(random_state=42)
```

```
log_reg.fit(X_train, y_train)
```



```

# SVM
svm = SVC(kernel='linear', random_state=42)
svm.fit(X_train, y_train)

# k-Nearest Neighbors
knn = KNeighborsClassifier(n_neighbors=5)
knn.fit(X_train, y_train)

# 6. Predykcja i ocena wyników
print("Regresja logistyczna:")
y_pred = log_reg.predict(X_test)
print(classification_report(y_test, y_pred))
print(confusion_matrix(y_test, y_pred))

print("\nSVM:")
y_pred = svm.predict(X_test)
print(classification_report(y_test, y_pred))
print(confusion_matrix(y_test, y_pred))

print("\nk-Nearest Neighbors:")
y_pred = knn.predict(X_test)
print(classification_report(y_test, y_pred))
print(confusion_matrix(y_test, y_pred))

# 7. Redukcja wymiarowości (PCA)
pca = PCA(n_components=2)
X_pca = pca.fit_transform(X)

# Wizualizacja wyników PCA
plt.figure(figsize=(8, 6))
plt.scatter(X_pca[:, 0], X_pca[:, 1], c=y, cmap='jet', alpha=0.5)
plt.colorbar()
plt.title("Wizualizacja danych po PCA")
plt.show()

# 8. Wizualizacja wyników t-SNE
tsne = TSNE(n_components=2, random_state=42)
X_tsne = tsne.fit_transform(X)

# Wizualizacja wyników t-SNE
plt.figure(figsize=(8, 6))
plt.scatter(X_tsne[:, 0], X_tsne[:, 1], c=y, cmap='jet', alpha=0.5)
plt.colorbar()
plt.title("Wizualizacja danych po t-SNE")
plt.show()

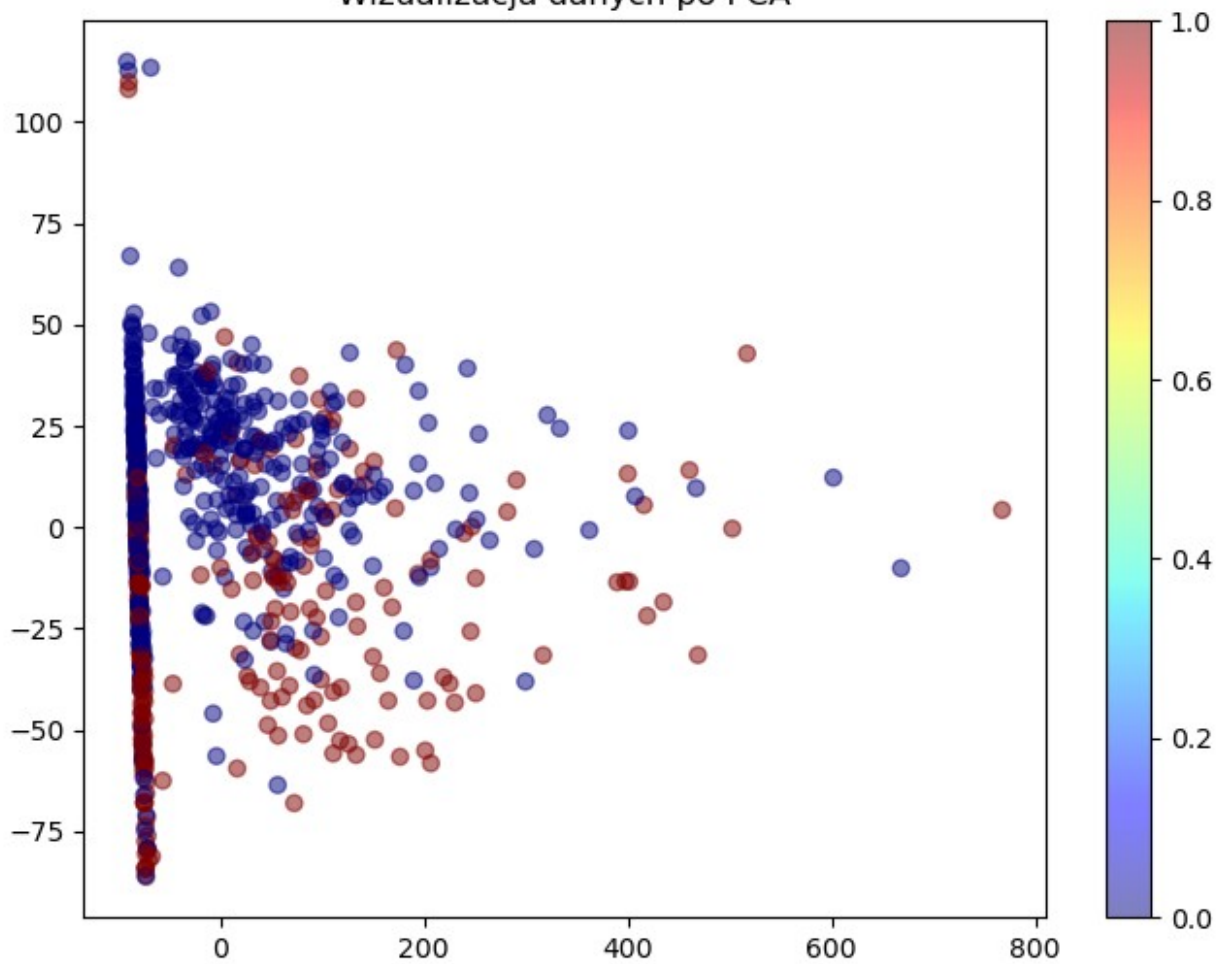
```

Regresja logistyczna:

	precision	recall	f1-score	support
0	0.81	0.80	0.81	99

1	0.65	0.67	0.66	55
accuracy			0.75	154
macro avg	0.73	0.74	0.73	154
weighted avg	0.76	0.75	0.75	154
[[79 20] [18 37]]				
SVM:				
	precision	recall	f1-score	support
0	0.81	0.82	0.81	99
1	0.67	0.65	0.66	55
accuracy			0.76	154
macro avg	0.74	0.74	0.74	154
weighted avg	0.76	0.76	0.76	154
[[81 18] [19 36]]				
k-Nearest Neighbors:				
	precision	recall	f1-score	support
0	0.75	0.80	0.77	99
1	0.58	0.51	0.54	55
accuracy			0.69	154
macro avg	0.66	0.65	0.66	154
weighted avg	0.69	0.69	0.69	154
[[79 20] [27 28]]				

Wizualizacja danych po PCA



Wizualizacja danych po t-SNE

