LAMPIRAN

LAMPIRAN 1

Ukuran dos (pack) aki untuk mobil, bus dan truk

Tipe	Kontainer	Ukuran dos (m)			Dipakai untuk
		Panjang	Lebar	Tinggi	
12N24-4	P	0.185	0.126	0.16	Daihatsu (minibus, pick up) Mazda Honda Life, Mitsubishi (minibus)
NS 40	P	0.195	0.127	0.2	Mitsubishi (minibus L300, Lancer), Toyota Kijang (old,new) Daihatsu (Jeep,minibus) , Suzuki Jimny, Citroen GS 1220 Holden, Toyota (Corolla, Corona), Datsun Sunny
NS 40 L	P	0.195	0.127	0.2	Mitsubishi (minibus L300, Lancer), Toyota Kijang (old,new) Daihatsu (Jeep,minibus) , Suzuki Jimny, Citroen GS 1220 Holden, Toyota (Corolla, Corona), Datsun Sunny
NS 40 Z	P	0.195	0.127	0.2	Toyota (corona,corolla), Mazda 323, Mitsubishi Galant, VW Combi, Ford Laser
NS 40 ZL	P	0.195	0.127	0.2	Toyota (corona,corolla), Mazda 323, Mitsubishi Galant, VW Combi, Ford Laser
N 40-1	P	0.235	0.127	0.198	Mitsubishi (colt), Honda Civic
N 40-2	E	0.235	0.134	0.205	Mitsubishi (colt), Honda Civic
N 50-1	P	0.258	0.17	0.198	Toyota (jeep F40), Mazda 323, Mitsubishi Galant (old), Datsun sedan 710, Peugeout (304,306), Mosevich sedan Dodge, HOLDEN, Honda (civic,accord)
N 50-2	E	0.258	0.17	0.202	Toyota (jeep F40), Mazda 323, Mitsubishi Galant (old), Datsun sedan 710, Peugeout (304,306), Mosevich sedan Dodge, HOLDEN, Honda (civic,accord)
NS 60/S	P	0.235	0.126	0.2	Mitsubishi (minibus L300, Lancer), Toyota Kijang (new), Minicab L100, Suzuki Jimny, Citroen GS 1220, Holden, Daihatsu (minibus L300), Toyota (corolla), Honda civic
NS 60L/LS	P	0.235	0.126	0.2	Mitsubishi (minibus L300, Lancer), Toyota Kijang (new), Daihatsu (minibus L300) Minicab L100, Suzuki Jimny, Citroen GS 1220, Holden, Honda civic, Toyota (corolla)

LAMPIRAN 2

Ukuran dos (pack) aki untuk mobil, bus dan truk

Tipe	Kontainer	Ukuran dos (m)			Dipakai untuk
		Panjang	Lebar	Tinggi	
N 50 Z	P	0.258	0.17	0.198	Mitsubishi (colt diesel fuso), Nissan Patrol, Hino truck (bus) Izusu truck, Mercedes Benz (sedan), Dodge, Chevrolet, Volvo 244, Alfa Romeo, Holden Cortine, Jeep CJ7, BMW, Landrover jeep, Toyota crown
N 60	E	0.258	0.17	0.202	Mitsubishi (colt diesel fuso), Nissan Patrol, Hino truck (bus) Izusu truck, Mercedes Benz (sedan), Dodge, Chevrolet, Volvo 244, Alfa Romeo, Holden Cortine, Jeep CJ7, BMW, Landrover jeep, Toyota crown
NS 70-1	P	0.258	0.17	0.198	Mitsubishi Fuso (truck)
NS 70-2	E	0.258	0.17	0.198	Mitsubishi Fuso (truck)
N 70-1	P	0.304	0.172	0.2	Toyota dyna (old), Datsun (diesel sedan), Mercedes Benz, Opel van, Isuzu truck, Jeep CJ7 diesel, Jeep Toyota diesel, Toyota Hiace diesel.
N 70-2	E	0.301	0.17	0.202	Toyota dyna (old), Datsun (diesel sedan), Mercedes Benz, Opel van, Isuzu truck, Jeep CJ7 diesel, Jeep Toyota diesel, Toyota Hiace diesel.
N 70Z-1	P	0.304	0.172	0.2	Toyota dyna (old), Datsun (diesel sedan), Mercedes Benz, Opel van, Isuzu truck, Jeep CJ7 diesel, Jeep Toyota diesel, Toyota Hiace diesel.
N 70Z-2	E	0.301	0.17	0.202	Toyota dyna (old), Datsun (diesel sedan), Mercedes Benz, Opel van, Isuzu truck, Jeep CJ7 diesel, Jeep Toyota diesel, Toyota Hiace diesel.
N 100-1	E	0.407	0.173	0.208	Toyota dyna (new), Daihatsu taft, Nissan truck, Isuzu truck
N 100-2	P	0.407	0.173	0.208	Toyota dyna (new), Daihatsu taft, Nissan truck, Isuzu truck
N 100 L	P	0.407	0.173	0.208	Toyota dyna (new), Daihatsu taft, Nissan truck, Isuzu truck

LAMPIRAN 3

Ukuran dos (pack) aki untuk mobil, bus dan truk

Tipe	Kontainer	Ukuran dos (m)			Dipakai untuk
		Panjang	Lebar	Tinggi	
N 120-1	E	0.5	0.181	0.21	Toyota truck, Mitsubishi truck (old), Daihatsu truck (old), Nissan Diesel truck, Mazda truck, Isuzu truck, Ford truck, Forklift, Tractors, Leyland bus, Hino truck
N 120-2	P	0.5	0.181	0.21	Toyota truck, Mitsubishi truck (old), Daihatsu truck (old), Nissan Diesel truck, Mazda truck, Isuzu truck, Ford truck, Forklift, Tractors, Leyland bus, Hino truck
N 150-1	E	0.504	0.22	0.21	Diesel truck, Generator, Tractor, Mercedes 911 (truck)
N 150-2	P	0.504	0.22	0.21	Diesel truck, Generator, Tractor, Mercedes 911 (truck)
N 200-1	C	0.522	0.276	0.22	Volvo bus 0610, Leylan Atlanta deck bus, Tractors, Generator, Mercedes OF 133 0306
N 200-2	P	0.522	0.276	0.22	Volvo bus 0610, Leylan Atlanta deck bus, Tractors, Generator, Mercedes OF 133 0306
54533	P	0.24	0.174	0.176	VW Safari, Golf, Citroen
55530	P	0.24	0.174	0.176	Renault
56024	P	0.24	0.174	0.176	Renault
56618	P	0.276	0.174	0.187	BMW, Mercedes Benz
58024	P	0.276	0.174	0.187	BMW, Mercedes Benz
60016	P	0.37	0.165	0.2	Mercedes Benz, Mercedes truck

Keterangan jenis aki menurut kontainer :
P = Plastic container (heat seal)
E : Ebonite container (adhesive seal)
C : Ebonite container (coumpound seal)

LAMPIRAN 4

Volume dos (pack) aki automotive dan motorcycle dengan toleransi sebesar 0.03 m

Tipe	Kontainer	Ukuran dos (m)			Ukuran dengan toleransi (m)			Volume (m3)
		Panjang	Lebar	Tinggi	Panjang	Lebar	Tinggi	P x L x T
12N24-4	P	0.185	0.126	0.16	0.215	0.156	0.19	0.006
NS 40	P	0.195	0.127	0.2	0.225	0.157	0.23	0.008
NS 40 L	P	0.195	0.127	0.2	0.225	0.157	0.23	0.008
NS 40 Z	P	0.195	0.127	0.2	0.225	0.157	0.23	0.008
NS 40 ZL	P	0.195	0.127	0.2	0.225	0.157	0.23	0.008
N 40-1	P	0.235	0.127	0.198	0.265	0.157	0.228	0.009
N 40-2	E	0.235	0.134	0.205	0.265	0.164	0.235	0.010
N 50-1	P	0.258	0.17	0.198	0.288	0.2	0.228	0.013
N 50-2	E	0.258	0.17	0.202	0.288	0.2	0.232	0.013
NS 60/S	P	0.235	0.126	0.2	0.265	0.156	0.23	0.010
NS 60L/LS	P	0.235	0.126	0.2	0.265	0.156	0.23	0.010
N 50 Z	P	0.258	0.17	0.198	0.288	0.2	0.228	0.013
N 60	E	0.258	0.17	0.202	0.288	0.2	0.232	0.013
NS 70-1	P	0.258	0.17	0.198	0.288	0.2	0.228	0.013
NS 70-2	E	0.258	0.17	0.198	0.288	0.2	0.228	0.013
N 70-1	P	0.304	0.172	0.2	0.334	0.202	0.23	0.016
N 70-2	E	0.301	0.17	0.202	0.331	0.2	0.232	0.015
N 70Z-1	P	0.304	0.172	0.2	0.334	0.202	0.23	0.016
N 70Z-2	E	0.301	0.17	0.202	0.331	0.2	0.232	0.015
N 100-1	E	0.407	0.173	0.208	0.437	0.203	0.238	0.021
N 100-2	P	0.407	0.173	0.208	0.437	0.203	0.238	0.021
N 100 L	P	0.407	0.173	0.208	0.437	0.203	0.238	0.021
N 120-1	E	0.5	0.181	0.21	0.53	0.211	0.24	0.027
N 120-2	P	0.5	0.181	0.21	0.53	0.211	0.24	0.027
N 150-1	E	0.504	0.22	0.21	0.534	0.25	0.24	0.032
N 150-2	P	0.504	0.22	0.21	0.534	0.25	0.24	0.032
N 200-1	C	0.522	0.276	0.22	0.552	0.306	0.25	0.042
N 200-2	P	0.522	0.276	0.22	0.552	0.306	0.25	0.042
54533	P	0.24	0.174	0.176	0.27	0.204	0.206	0.011
55530	P	0.24	0.174	0.176	0.27	0.204	0.206	0.011
56024	P	0.24	0.174	0.176	0.27	0.204	0.206	0.011
56618	P	0.276	0.174	0.187	0.306	0.204	0.217	0.014
58024	P	0.276	0.174	0.187	0.306	0.204	0.217	0.014
60016	P	0.37	0.165	0.2	0.4	0.195	0.23	0.018

LAMPIRAN 5

Tipe	Kontainer	Ukuran dos (m)			Ukuran dengan toleransi (m)			Volume (m3)
		Panjang	Lebar	Tinggi	Panjang	Lebar	Tinggi	P x L x T
MB 1	P	0.071	0.071	0.096	0.101	0.101	0.126	0.001
MB 2	P	0.057	0.061	0.131	0.087	0.091	0.161	0.001
MB 3	P	0.099	0.057	0.12	0.129	0.087	0.15	0.002
MB 4	P	0.099	0.057	0.12	0.129	0.087	0.15	0.002
MB 5	P	0.15	0.07	0.1	0.18	0.1	0.13	0.002
MB 6	P	0.081	0.071	0.106	0.111	0.101	0.136	0.002
MB 7	P	0.121	0.071	0.093	0.151	0.101	0.123	0.002
MB 8	P	0.131	0.06	0.13	0.161	0.09	0.16	0.002
MB 9	P	0.135	0.06	0.13	0.165	0.09	0.16	0.002
MB 10	P	0.136	0.076	0.14	0.166	0.106	0.17	0.003
MB 11	P	0.136	0.076	0.14	0.166	0.106	0.17	0.003
MB 12	P	0.135	0.06	0.13	0.165	0.09	0.16	0.002

LAMPIRAN 6

Jumlah kiriman aki automotive dan motorcycle (dalam unit produk)

Tipe																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
12N24-4	8	1	9	7	9	9	3	0	4	6	1	7	9	3	3	8
NS 40	6	9	5	3	3	1	2	4	2	2	4	7	4	8	2	2
NS 40 L	6	1	1	4	2	8	2	7	4	9	6	9	2	3	4	10
NS 40 Z	6	6	10	9	5	1	3	3	9	8	6	6	3	1	5	4
NS 40 ZL	9	2	9	10	2	4	4	3	1	1	7	5	2	2	8	2
N 40-1	7	3	7	1	5	5	5	7	9	2	8	5	8	7	1	2
N 40-2	4	9	5	7	3	9	7	6	6	9	3	3	8	6	10	2
N 50-1	0	5	10	8	7	9	4	0	7	5	2	1	7	9	0	4
N 50-2	3	1	0	2	0	8	10	5	9	9	3	9	3	8	5	9
NS 60/S	7	0	3	4	0	3	4	8	9	4	3	4	9	7	9	2
NS 60L/LS	5	10	3	2	9	1	10	2	7	7	1	0	4	0	3	10
N 50 Z	1	4	2	1	7	1	9	1	2	6	1	2	2	9	1	3
N 60	3	0	9	8	3	9	6	6	7	8	10	5	2	7	7	1
NS 70-1	2	2	1	10	2	1	10	6	2	8	2	4	4	5	8	8
NS 70-2	6	9	2	1	3	3	2	7	3	2	9	5	1	7	2	6
N 70-1	4	4	7	0	6	9	1	6	3	6	1	10	2	8	4	3
N 70-2	5	2	4	8	2	8	3	8	6	8	7	4	3	1	2	4
N 70Z-1	5	7	3	4	2	6	5	4	8	0	0	10	9	10	1	2
N 70Z-2	10	6	6	7	8	2	9	10	2	7	10	0	0	7	2	9
N 100-1	4	9	9	7	5	10	7	7	6	4	3	9	6	9	4	3
N 100-2	8	3	0	0	4	6	3	6	6	6	6	2	8	5	7	7
N 100 L	4	1	4	5	1	0	0	4	5	6	10	9	2	9	6	0
N 120-1	1	9	8	2	0	7	2	8	8	3	7	5	9	5	7	8
N 120-2	9	8	9	1	5	7	5	5	8	4	1	5	4	5	6	3
N 150-1	3	2	6	4	3	4	8	10	10	3	2	6	5	9	1	3
N 150-2	7	3	2	0	6	2	9	5	6	5	4	5	7	5	9	1
N 200-1	3	2	6	7	3	10	2	5	7	9	2	4	9	10	1	7
N 200-2	4	4	7	5	8	3	9	7	5	7	7	1	7	6	3	4
54533	1	5	10	0	10	7	5	4	10	10	6	5	10	2	9	7
55530	9	0	4	0	9	2	4	1	9	5	4	9	3	4	0	6
56024	0	3	5	2	4	3	6	4	3	7	9	4	6	1	4	2
56618	6	0	6	3	6	5	7	9	1	9	8	5	1	7	5	1
58024	6	5	6	6	1	3	5	1	4	3	2	7	8	8	8	0
60016	10	7	1	6	5	9	8	7	9	10	7	10	5	7	1	4
MB 1	10	5	6	8	5	1	8	5	8	1	6	2	3	3	2	6

LAMPIRAN 7

Tipe																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MB 2	8	7	2	1	5	1	1	4	3	3	2	8	3	7	6	3
MB 3	3	1	6	2	8	10	1	7	1	8	8	9	2	8	6	8
MB 4	8	9	9	5	3	2	1	7	8	4	1	2	7	3	2	8
MB 5	4	1	4	5	6	7	9	3	0	0	7	8	9	5	8	5
MB 6	4	4	8	2	3	2	2	7	5	1	4	8	3	6	1	8
MB 7	2	8	7	9	2	1	8	8	8	0	9	3	1	4	10	6
MB 8	5	7	8	6	2	5	8	1	1	8	5	4	4	1	6	7
MB 9	4	10	9	3	8	7	1	7	1	2	6	4	7	9	1	5
MB 10	6	2	2	7	4	7	6	9	7	1	3	1	1	1	5	4
MB 11	4	6	1	2	0	0	2	5	3	3	8	2	6	2	9	3
MB 12	5	5	8	5	3	3	6	9	3	9	9	6	4	4	10	1

LAMPIRAN 8

Volume kiriman aki automotive dan motorcycle tiap distributor (dalam m3)

Tipe	Distributor							
	1	2	3	4	5	6	7	8
12N24-4	0.050	0.009	0.060	0.043	0.059	0.059	0.017	0.003
NS 40	0.046	0.077	0.039	0.023	0.025	0.006	0.014	0.031
NS 40 L	0.050	0.005	0.007	0.029	0.019	0.067	0.014	0.056
NS 40 Z	0.048	0.048	0.080	0.077	0.038	0.006	0.021	0.027
NS 40 ZL	0.070	0.020	0.076	0.080	0.020	0.029	0.034	0.026
N 40-1	0.069	0.024	0.065	0.010	0.048	0.046	0.045	0.069
N 40-2	0.037	0.089	0.051	0.067	0.031	0.092	0.072	0.063
N 50-1	0.005	0.070	0.130	0.099	0.087	0.124	0.050	0.001
N 50-2	0.042	0.020	0.003	0.033	0.005	0.110	0.129	0.067
NS 60/S	0.069	0.001	0.032	0.034	0.004	0.032	0.036	0.074
NS 60L/LS	0.049	0.092	0.026	0.019	0.087	0.011	0.091	0.021
N 50 Z	0.015	0.051	0.031	0.015	0.097	0.017	0.115	0.011
N 60	0.036	0.006	0.114	0.111	0.038	0.119	0.080	0.082
NS 70-1	0.020	0.031	0.013	0.130	0.024	0.014	0.127	0.080
NS 70-2	0.085	0.119	0.031	0.009	0.041	0.037	0.021	0.086
N 70-1	0.059	0.062	0.105	0.002	0.099	0.146	0.018	0.098
N 70-2	0.083	0.038	0.063	0.127	0.037	0.123	0.041	0.118
N 70Z-1	0.079	0.116	0.052	0.055	0.030	0.097	0.081	0.062
N 70Z-2	0.148	0.088	0.089	0.108	0.121	0.026	0.132	0.152
N 100-1	0.076	0.199	0.185	0.140	0.114	0.204	0.148	0.140
N 100-2	0.163	0.057	0.010	0.008	0.089	0.125	0.057	0.132
N 100 L	0.087	0.015	0.087	0.102	0.030	0.008	0.006	0.080
N 120-1	0.039	0.232	0.217	0.051	0.006	0.187	0.053	0.223
N 120-2	0.244	0.220	0.231	0.021	0.123	0.195	0.127	0.130
N 150-1	0.087	0.052	0.197	0.114	0.102	0.115	0.242	0.305
N 150-2	0.217	0.084	0.069	0.010	0.205	0.066	0.282	0.154
N 200-1	0.122	0.075	0.242	0.279	0.120	0.415	0.086	0.217
N 200-2	0.169	0.185	0.314	0.221	0.326	0.112	0.381	0.275
54533	0.015	0.053	0.108	0.003	0.110	0.082	0.059	0.043
55530	0.097	0.002	0.051	0.002	0.107	0.026	0.050	0.013
56024	0.004	0.031	0.056	0.024	0.051	0.032	0.067	0.041
56618	0.078	0.004	0.081	0.037	0.084	0.074	0.100	0.118
58024	0.080	0.067	0.077	0.078	0.012	0.040	0.067	0.015
60016	0.179	0.123	0.015	0.107	0.098	0.157	0.145	0.128

LAMPIRAN 9

MB 1	0.012	0.006	0.008	0.010	0.007	0.001	0.010	0.006
MB 2	0.010	0.009	0.002	0.002	0.007	0.001	0.001	0.004
MB 3	0.005	0.002	0.011	0.004	0.014	0.017	0.001	0.012
MB 4	0.014	0.015	0.015	0.009	0.005	0.003	0.002	0.011
MB 5	0.009	0.001	0.010	0.012	0.014	0.016	0.021	0.006
MB 6	0.006	0.006	0.012	0.003	0.005	0.004	0.003	0.011
MB 7	0.003	0.015	0.012	0.018	0.003	0.002	0.016	0.014
MB 8	0.013	0.016	0.019	0.015	0.005	0.012	0.017	0.003
MB 9	0.009	0.023	0.022	0.006	0.018	0.016	0.002	0.016
MB 10	0.017	0.005	0.007	0.022	0.013	0.020	0.019	0.027
MB 11	0.013	0.017	0.002	0.005	0.001	0.001	0.007	0.016
MB 12	0.011	0.011	0.018	0.013	0.008	0.007	0.014	0.022
Total	2.840	2.497	3.144	2.383	2.582	3.097	3.124	3.294

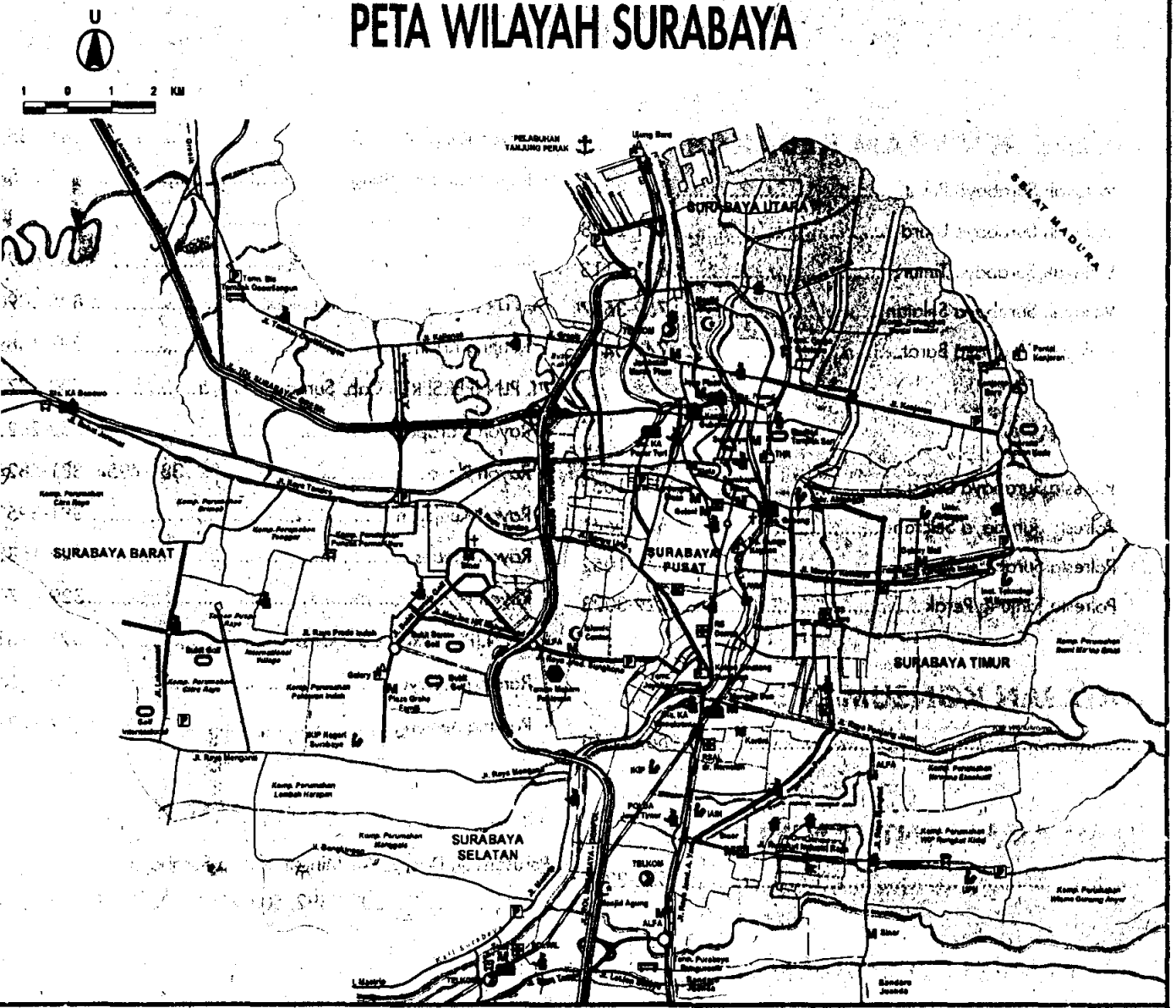
LAMPIRAN 10

Tipe	Distributor							
	9	10	11	12	13	14	15	16
12N24-4	0.025	0.037	0.008	0.042	0.059	0.022	0.020	0.048
NS 40	0.017	0.014	0.036	0.054	0.035	0.064	0.017	0.019
NS 40 L	0.031	0.074	0.046	0.069	0.018	0.025	0.035	0.080
NS 40 Z	0.076	0.068	0.046	0.050	0.020	0.010	0.043	0.036
NS 40 ZL	0.006	0.006	0.057	0.040	0.012	0.013	0.063	0.013
N 40-1	0.082	0.014	0.078	0.047	0.074	0.067	0.007	0.022
N 40-2	0.064	0.093	0.035	0.036	0.078	0.060	0.100	0.025
N 50-1	0.090	0.064	0.029	0.013	0.090	0.121	0.000	0.051
N 50-2	0.119	0.118	0.036	0.120	0.035	0.112	0.070	0.123
NS 60/S	0.084	0.034	0.028	0.038	0.083	0.064	0.088	0.016
NS 60L/LS	0.067	0.065	0.010	0.003	0.039	0.002	0.025	0.093
N 50 Z	0.020	0.082	0.019	0.032	0.022	0.118	0.008	0.038
N 60	0.098	0.109	0.130	0.069	0.023	0.087	0.096	0.013
NS 70-1	0.020	0.100	0.031	0.052	0.054	0.070	0.107	0.103
NS 70-2	0.045	0.025	0.122	0.067	0.015	0.088	0.025	0.083
N 70-1	0.051	0.099	0.019	0.152	0.033	0.121	0.069	0.043
N 70-2	0.094	0.124	0.106	0.055	0.052	0.009	0.036	0.065
N 70Z-1	0.126	0.004	0.004	0.152	0.146	0.150	0.010	0.028
N 70Z-2	0.029	0.115	0.154	0.003	0.000	0.106	0.027	0.132
N 100-1	0.120	0.078	0.054	0.184	0.135	0.189	0.086	0.065
N 100-2	0.126	0.133	0.119	0.042	0.178	0.106	0.146	0.156
N 100 L	0.096	0.129	0.201	0.195	0.043	0.200	0.116	0.000
N 120-1	0.202	0.069	0.182	0.141	0.231	0.133	0.179	0.218
N 120-2	0.204	0.108	0.020	0.146	0.096	0.144	0.163	0.072
N 150-1	0.318	0.095	0.069	0.197	0.156	0.300	0.026	0.096
N 150-2	0.184	0.160	0.114	0.161	0.221	0.164	0.300	0.024
N 200-1	0.309	0.362	0.096	0.179	0.376	0.411	0.040	0.296
N 200-2	0.220	0.305	0.292	0.032	0.309	0.238	0.109	0.164
54533	0.113	0.109	0.065	0.057	0.111	0.018	0.106	0.075
55530	0.098	0.062	0.048	0.101	0.039	0.041	0.001	0.067
56024	0.036	0.084	0.103	0.046	0.068	0.012	0.045	0.026
56618	0.017	0.122	0.109	0.073	0.010	0.098	0.063	0.013
58024	0.053	0.041	0.022	0.099	0.113	0.114	0.113	0.000
60016	0.154	0.178	0.122	0.174	0.084	0.126	0.025	0.077
MB 1	0.010	0.001	0.008	0.002	0.004	0.004	0.002	0.007

LAMPIRAN 11

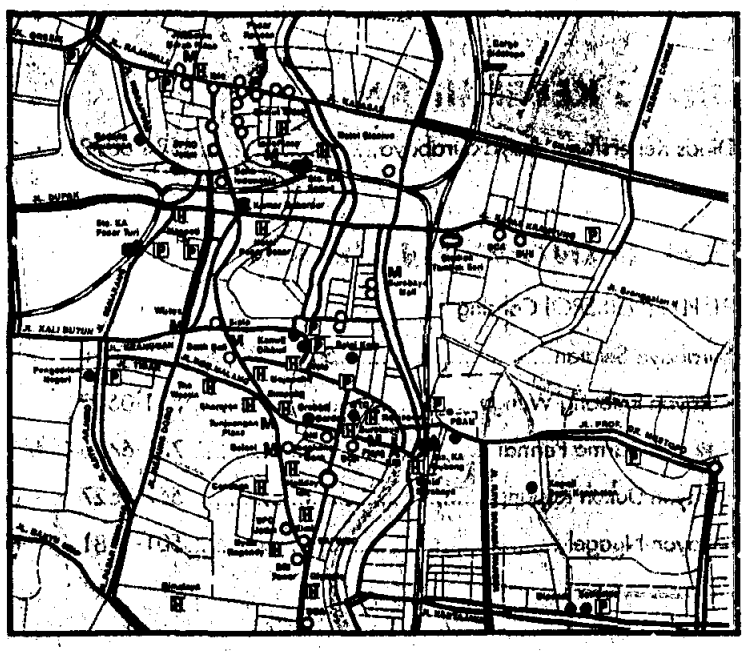
MB 2	0.004	0.004	0.002	0.010	0.004	0.009	0.007	0.003
MB 3	0.001	0.014	0.013	0.014	0.004	0.013	0.010	0.013
MB 4	0.013	0.007	0.001	0.004	0.011	0.005	0.003	0.013
MB 5	0.000	0.001	0.017	0.019	0.021	0.011	0.020	0.011
MB 6	0.007	0.002	0.006	0.011	0.005	0.009	0.002	0.012
MB 7	0.015	0.000	0.016	0.006	0.001	0.007	0.018	0.012
MB 8	0.003	0.018	0.011	0.010	0.009	0.001	0.014	0.017
MB 9	0.003	0.004	0.014	0.009	0.018	0.022	0.002	0.013
MB 10	0.022	0.002	0.010	0.003	0.002	0.004	0.015	0.012
MB 11	0.010	0.010	0.024	0.005	0.017	0.006	0.027	0.009
MB 12	0.008	0.021	0.022	0.014	0.009	0.009	0.023	0.003
Total	3.489	3.366	2.749	3.028	3.162	3.703	2.508	2.508

PETA WILAYAH SURABAYA



LEGENDA

- Jalan TOL
- Jalan Raya Utama
- Jalan Raya
- Jalan Kereta Api
- Sungai
- Danau/Waduk
- Kantor Gubernur
- Perkantoran
- Bank
- Hotel/Apartemen
- Mal, Plaza
- Pasar
- Stasiun Pompa Bensin
- Sarana Olah Raga
- Stasiun Pemancar
- Stasiun Kereta Api
- Terminal Bis
- Terminal Truk
- Pelabuhan Laut



LAMPIRAN

STRUKTRUR PROGRAM KOMPUTER ALGORITMA GREEDY/NEAREST NEIGHBOUR SEARCH DAN SIMULATED ANNEALING

```
#include <conio.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <math.h>
#include <time.h>

/* ------ CONSTANTA ------ */
const unsigned int MaxNode  = 100;
const unsigned int MaxRute  = 10;
const unsigned int MaxMobil = 10;

/* ------ DAFTAR FUNGSI ------ */
// Fungsi Buat Menu
void UbahMenu1(unsigned char menu);
void UbahMenu2(unsigned char menu);
// Fungsi Untuk Input Data
void InputData();
void InputRute();
void InputBiayaPerKm();
void InputPinalti();
void InputPermintaan();
void InputDataMobil ();
void InputDataSA();

// Fungsi Untuk Proses Gredy dan SA
void Proses();

// Fungsi Untuk Hitung T (SA)
void HitungT (
      double &T,
      int top[MaxRute],
      int s[MaxRute][MaxNode+1],
      int SumRute,
      float  Jarak[MaxNode+1][MaxNode+1],
      int TERIMA[MaxRute],
      double DENDA);

// Fungsi Untuk Tampilkan Tabel Simulated Annealing (SA)
void TampilTabel(
      int s[MaxRute][MaxNode+1],
      int top[MaxRute],
      FILE *f,
      float  Jarak[MaxNode+1][MaxNode+1],
      int SumRute,
      int SumMobil,
      int TERIMA[MaxRute],
      int tampil,
      double DENDA,
      double Order[MaxNode],
      double Kapasitas[MaxMobil]);

// Fungsi Untuk Tampilkan Tabel Biaya   (SA)
void TabelBiaya(
      int s[MaxRute][MaxNode+1],
      int top[MaxRute],
      FILE *f2,
      float  Jarak[MaxNode+1][MaxNode+1],
```

```
      int SumRute,
      int TERIMA[MaxRute],
      double DENDA);

// Fungsi untuk Mengetahui apakah rute layak atau tidak  (SA) dan (gredy)
void CekTerima(FILE *f, int TERIMA[MaxNode], int &Lanjut, int SumRute);

/* ------ FUNGSI UTAMA ------ */
void main()
{
  unsigned char *menu, *tombol;
  menu   = new (unsigned char);
  tombol = new (unsigned char);
  (*menu)=1;
  while ((*menu>=1)&&(*menu<=8))
  {
    clrscr();
    gotoxy(15,5):
printf("°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°");
    gotoxy(15,6); printf("°°  ALGORITMA GREEDY / NEASERT NEIGHBOUR SEARCH
°°");
    gotoxy(15,7); printf("°°                          DAN
°°");
    gotoxy(15,8); printf("°°       ALGORITMA SIMULATED ANNEALING (SA)
°°");
    gotoxy(15,9);
printf("°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°");
    gotoxy(26,12); printf("²²²²²²²²²²²²²²²²²²²²²²²²²²²²²²");
    gotoxy(26,13); printf("²²   Input Jarak dan Node   ²²");
    gotoxy(26,14); printf("²²    Input Jumlah Order    ²²");
    gotoxy(26,15); printf("²²     Input Jumlah Rute    ²²");
    gotoxy(26,16); printf("²²    Input Biaya (Rp/Km)   ²²");
    gotoxy(26,17); printf("²²      Input Data SA       ²²");
    gotoxy(26,18); printf("²²      Input Pinalti       ²²");
    gotoxy(26,19); printf("²²   Input Data Kendaraan   ²²");
    gotoxy(26,20); printf("²²    Proses Perhitungan    ²²");
    gotoxy(26,21); printf("²²       K e l u a r        ²²");
    gotoxy(26,22); printf("²²²²²²²²²²²²²²²²²²²²²²²²²²²²²²");
    UbahMenu2(*menu);
    _setcursortype(_NOCURSOR);
    (*tombol) = 1;
    while ((*tombol)!=13)
    {
       if (kbhit())
       {   //72,80
        (*tombol)=getch();
        switch (*tombol)
        {
          case 72 : if (*menu>1)
                 {      UbahMenu1(*menu); (*menu)--; UbahMenu2(*menu); }
break;
          case 80 : if (*menu<9)
                 {      UbahMenu1(*menu); (*menu)++; UbahMenu2(*menu); }
break;
        }
       }
    }
    switch (*menu)
```

```
    {
      case 1 : InputData();                    break;
      case 2 : InputPermintaan();          break;
      case 3 : InputRute();                break;
      case 4 : InputBiayaPerKm();              break;
      case 5 : InputDataSA();                  break;
      case 6 : InputPinalti();               break;
      case 7 : InputDataMobil();             break;
      case 8 : Proses();                       break;
    }
  }
  _setcursortype(_NORMALCURSOR);
  gotoxy(35,24); printf("Terima Kasih");
  gotoxy(30,25); printf("Tekan Sembarang Tombol");
  getch();
  delete (menu);
  delete (tombol);
  clrscr();
}


void Proses()
{
  randomize();
  FILE *f1, *f2, *f3, *f4;
  int *ulang, *pos, *awal, *akhir;
  int *SumRute, *SumNode, *SumMobil;
  int *ntemp, *N;
  int *tampil;
  int *Lanjut;
  int *ACAK1, *ACAK2;
  int *CADANG;
  int *arah;  // 0 atas 1 bawah
  ntemp    = new (int);
  N        = new (int);
  tampil   = new (int);
  Lanjut   = new (int);
  ACAK1    = new (int);
  ACAK2    = new (int);
  CADANG   = new (int);
  arah     = new (int);

  SumMobil = new (int);
  SumNode  = new (int);
  SumRute  = new (int);
  ulang = new (int);
  pos   = new (int);
  awal  = new (int);
  akhir = new (int);

  double *Y , *X , *T, *DENDA;
  double *TLAMA, *TBARU;
  double *jumlah;
  double *Tawal, *Takhir, *A, *Delta;
  double *HITUNG, *HITUNG1, *HITUNG2;

  Y      = new (double);
  X      = new (double);
```

```
  T      = new (double);
  DENDA  = new (double);
  TLAMA  = new (double);
  TBARU  = new (double);
  jumlah = new (double);
  Tawal  = new (double);
  Takhir = new (double);
  A      = new (double);
  Delta  = new (double);
  HITUNG = new (double);
  HITUNG1= new (double);
  HITUNG2= new (double);
  struct simpan
  {
      char Nama[101];
      float  Jarak[MaxNode+1][MaxNode+1];
      int sTemp[MaxRute][MaxNode+1];
      int topTemp[MaxRute];
      int sHasil[MaxRute][MaxNode+1];
      int topHasil[MaxRute];
      int TERIMA[MaxRute];
      int s[MaxRute][MaxNode+1];
      int top[MaxRute];
      int cek[MaxNode+1];
      double Order[MaxNode], Kapasitas[MaxMobil];
      int i,j,k;
  };
  simpan *ptr;
  ptr = new(simpan);

  f1=fopen("MOBIL.TXT","r+");
  fscanf(f1,"%d",&(*SumMobil));
  for ((*ptr).i=0; (*ptr).i<(*SumMobil); (*ptr).i++)
      fscanf(f1,"%lf",&(*ptr).Kapasitas[(*ptr).i]);
  fclose(f1);
  f1=fopen("DENDA.TXT","r+");
  fscanf(f1,"%lf",&(*DENDA));
  fclose(f1);


  if (((f4=fopen("INPUT.TXT", "r+" ))!=NULL)&&
      ((f2=fopen("PROSES.TXT", "w+"))!=NULL) )
  {
// MASUK ALGORITMA GREEDY / NEASERT NEIGHBOUR SEARCH

     f1=fopen("RUTE.TXT", "r+"  );
     fscanf(f1,"%d",&(*SumRute));
     fclose(f1);

     // Ambil Data di FILE Data.txt
     f1=fopen("DATA.TXT","r+");
     fscanf(f1,"%d",&(*SumNode));
     f3=fopen("ORDER.TXT","r+");
     for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
        fscanf(f3,"%lf",&(*ptr).Order[(*ptr).i]);
     fclose(f3);
     fprintf(f2,"ALGORITMA GREEDY / NEASERT NEIGHBOUR SEARCH\n");
     fprintf(f2,"-----------------------------------------\n\n\n");
```

```
     fprintf(f2,"Jumlah Rute          : %3d\n",(*SumRute));
     fprintf(f2,"Jumlah Distributor   : %3d\n",(*SumNode));
     double *MOBIL;
     MOBIL =new (double);
     if ( (f3=fopen("MOBIL.TXT","r+"))!=NULL)
     {
      fscanf(f3,"%d",&(*ptr).j);
      fprintf(f2,"Jumlah Jenis Mobil    : %3d\n\n",(*ptr).j);
      fprintf(f2,"Daftar jenis Mobil berdasarkan daya angkut\n");
      fprintf(f2,"-----------------------------------\n");
      fprintf(f2,"| Jenis Mobil | Daya Angkut Mobil |\n");
      fprintf(f2,"-----------------------------------\n");
      for ((*ptr).i=0; (*ptr).i<(*ptr).j; (*ptr).i++)
      {
          fscanf(f3,"%lf",&(*MOBIL));
          fprintf(f2,"|    %6d     |   %15.3lf   |\n",(*ptr).i+1,(*MOBIL));
      }
      fprintf(f2,"-----------------------------------\n\n");
      fclose(f3);
     }
     delete (MOBIL);
     fprintf(f2,"Depot/titik pusat :\n");
     fprintf(f2,"-------------------------------------------------------------
\n");
     fprintf(f2,"|                      L o k a s i                      | Node
|\n");
     fprintf(f2,"-------------------------------------------------------------
\n");
     fscanf(f1,"%s",&(*ptr).Nama);
     fprintf(f2,"| %-50s | %3d  |\n",(*ptr).Nama,0);
     fprintf(f2,"-------------------------------------------------------------
\n\n");
     fprintf(f2,"Daerah pemasaran / titik tujuan :\n");
     fprintf(f2,"-------------------------------------------------------------
------------------\n");
     fprintf(f2,"|                      L o k a s i                      | Node |
Jumlah Order  |\n");
     fprintf(f2,"-------------------------------------------------------------
------------------\n");
     for ((*ptr).i=1; (*ptr).i<=(*SumNode); (*ptr).i++)
     {
       fflush(stdin);
       fscanf(f1,"%s\n",&(*ptr).Nama);
       fprintf(f2,"| %-50s | %3d  | %15.3lf
|\n",(*ptr).Nama,(*ptr).i,(*ptr).Order[(*ptr).i]);
     }
     fprintf(f2,"-------------------------------------------------------------
------------------\n\n");
     fflush(stdin);
     fprintf(f2,"Jarak Antar titik Lokasi (km)\n");
     for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
       fprintf(f2,"------------");
     fprintf(f2,"----------\n");
     fprintf(f2,"| Lokasi |");
     for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
       fprintf(f2,"%10d |",(*ptr).i);
     fprintf(f2,"\n");
     for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
```

```
      fprintf(f2,"------------");
    fprintf(f2,"----------\n");
    for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
    {
      fprintf(f2,"|  %3d   |",(*ptr).i);
      for ((*ptr).j=0; (*ptr).j<=(*SumNode); (*ptr).j++)
      {
          fscanf(f1,"%f",&(*ptr).Jarak[(*ptr).i][(*ptr).j]);
          fprintf(f2,"%10.3f |",(*ptr).Jarak[(*ptr).i][(*ptr).j]);
      }
      fscanf(f1,"\n");
      fprintf(f2,"\n");
    }
    for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
      fprintf(f2,"------------");
    fprintf(f2,"----------\n\n");
    fclose(f1);
    // Proses Perhitungan
    for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
      (*ptr).cek[(*ptr).i]=0;
    (*ptr).cek[0]=1;
    for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
    {
      (*ptr).top[(*ptr).i]=0;
      (*ptr).s[(*ptr).i][(*ptr).top[(*ptr).i]]=0;
    }
    (*arah)  =1;
    (*ulang) =1;
    (*pos)   =0;
    while ( (*ulang) ==1)
    {
      if ((*arah)==1)
      {
       if ( (*pos)<=(*SumRute)-1)
       {
          (*awal) =(*ptr).s[(*pos)][(*ptr).top[(*pos)]];
          for ((*ptr).i=1; (*ptr).i<=(*SumNode); (*ptr).i++)
            if ((*ptr).cek[(*ptr).i]==0)
            {
               (*akhir) =(*ptr).i; break;
            }
          (*ptr).cek[(*akhir)]=1;
          for ((*ptr).i=1; (*ptr).i<=(*SumNode); (*ptr).i++)
            if (((*ptr).cek[(*ptr).i]==0)&&
(((*ptr).Jarak[(*awal)][(*akhir)]>(*ptr).Jarak[(*awal)][(*ptr).i])&&((*akhir)!
=(*awal))) )
            {
               (*ptr).cek[(*akhir)]=0;
               (*akhir)=(*ptr).i;
               (*ptr).cek[(*akhir)]=1;
            }
          (*ptr).top[(*pos)]++;
          (*ptr).s[(*pos)][(*ptr).top[(*pos)]]=(*akhir);
          (*pos)++;
       }
       else
       {
          (*pos) =(*SumRute)-1;
```

```
            (*arah)=0;
          }
        }
        else
        {
         if ((*pos)>=0)
         {
            (*awal) =(*ptr).s[(*pos)][(*ptr).top[(*pos)]];
            for ((*ptr).i=1; (*ptr).i<=(*SumNode); (*ptr).i++)
              if ((*ptr).cek[(*ptr).i]==0)
              {
                 (*akhir) =(*ptr).i; break;
              }
            (*ptr).cek[(*akhir)]=1;
            for ((*ptr).i=1; (*ptr).i<=(*SumNode); (*ptr).i++)
              if (((*ptr).cek[(*ptr).i]==0)&&
(((*ptr).Jarak[(*awal)][(*akhir)]>(*ptr).Jarak[(*awal)][(*ptr).i])&&((*akhir)!
=(*awal))) )
              {
                 (*ptr).cek[(*akhir)]=0;
                 (*akhir)=(*ptr).i;
                 (*ptr).cek[(*akhir)]=1;
              }
            (*ptr).s[(*pos)][++(*ptr).top[(*pos)]]=(*akhir);
            (*pos)--;
         }
         else
         {
            (*pos)=0;
            (*arah)=1;
         }
        }
        (*ulang)=0;
        for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
          if ((*ptr).cek[(*ptr).i]==0) (*ulang) =1;
      }
      delete (ulang);
      delete (pos);
      delete (awal);
      delete (akhir);
      for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
        (*ptr).s[(*ptr).i][++(*ptr).top[(*ptr).i]]=0;
      (*tampil) = 0;
      for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
        if ((*ptr).top[(*ptr).i]>(*tampil)) (*tampil)=(*ptr).top[(*ptr).i];
      clrscr();
      if (((*SumRute)>20)||((*SumNode)/(*SumRute)>6))
      {
       (*ptr).k=0;
       printf("Layar Tidak Mencukupi Untuk Menampilkan Semua Data\n");
       printf("Data dapat dilihat di FILE PROSES.TXT");
      }
      else                                          (*ptr).k=1;
      fprintf(f2,"Susunan Rute jalur distribusi\n");
      if ((*ptr).k==1) printf("Susunan Rute jalur distribusi\n");
      for ((*ptr).i=0; (*ptr).i<(*tampil); (*ptr).i++)
      {
        fprintf(f2,"------");
```

```
      if ((*ptr).k==1) printf("------");
    }
    fprintf(f2,"-------------------------------------------------------------
\n");
    if ((*ptr).k==1) printf("-----------------------------------\n");
    fprintf(f2,"|    Rute   | Susunan  ");
    if ((*ptr).k==1)  printf("|    Rute   | Susunan");
    for ((*ptr).i=0; (*ptr).i<(*tampil)-1; (*ptr).i++)
    {
      fprintf(f2,"      ");
      if ((*ptr).k==1) printf("      ");
    }
    fprintf(f2,"  | Total Jarak (km) | Volume kirim m3 |\n");
    if ((*ptr).k==1) printf("  | Total Jarak (km) |\n");
    for ((*ptr).i=0; (*ptr).i<(*tampil); (*ptr).i++)
    {
      fprintf(f2,"------");
      if ((*ptr).k==1) printf("------");
    }
    fprintf(f2,"-------------------------------------------------------------
\n");
    if ((*ptr).k==1) printf("-----------------------------------\n");
    (*T)=0;
    (*HITUNG1) = 0;
    for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
    {
      (*jumlah)=0;
      (*ptr).TERIMA[(*ptr).i]=-1;
      fprintf(f2,"|     %c     |",65+(*ptr).i);
      if ((*ptr).k==1) printf("|    %c    |",65+(*ptr).i);
      (*HITUNG2) = 0;
      for ((*ptr).j=0; (*ptr).j<(*ptr).top[(*ptr).i]; (*ptr).j++)
      {
          (*jumlah)+=(*ptr).Jarak[(*ptr).s[(*ptr).i][(*ptr).j]]
[(*ptr).s[(*ptr).i][(*ptr).j+1]];
          fprintf(f2," %3d -",(*ptr).s[(*ptr).i][(*ptr).j]);
          if ((*ptr).k==1) printf(" %3d -",(*ptr).s[(*ptr).i][(*ptr).j]);
          (*HITUNG2) +=(*ptr).Order[(*ptr).s[(*ptr).i][(*ptr).j]];

      }
      (*HITUNG1)+=(*HITUNG2);
      fprintf(f2," %3d  ",(*ptr).s[(*ptr).i][(*ptr).top[(*ptr).i]]);
      if ((*ptr).k==1) printf(" %3d
",(*ptr).s[(*ptr).i][(*ptr).top[(*ptr).i]]);
      for (;(*ptr).j<(*tampil); (*ptr).j++)
      {
          fprintf(f2,"      ");
          if ((*ptr).k==1) printf("      ");
      }

      for ((*ptr).j=0; (*ptr).j<(*SumMobil); (*ptr).j++)
          if ((*HITUNG2)<=(*ptr).Kapasitas[(*ptr).j])
          {
           (*ptr).TERIMA[(*ptr).i]=(*ptr).j;
           break;
          }
      fprintf(f2,"|    %10.3lf    | %15.3lf |\n",(*jumlah),(*HITUNG2));
      if ((*ptr).k==1) printf("|    %10.3lf    |\n",(*jumlah));
```

```
      (*T)+=(double)(*jumlah);
    }
    for ((*ptr).i=0; (*ptr).i<(*tampil); (*ptr).i++)
    {
      fprintf(f2,"------");
      if ((*ptr).k==1) printf("------");
    }
    fprintf(f2,"------------------------------------------------------------
\n");
    if ((*ptr).k==1) printf("-------------------------------------\n");
    fprintf(f2,"|                  ");
    if ((*ptr).k==1) printf("|                  ");
    for ((*ptr).i=0; (*ptr).i<(*tampil); (*ptr).i++)
    {
      fprintf(f2,"      ");
      if ((*ptr).k==1) printf("      ");
    }
    fprintf(f2,"|    %10.3lf    | %15.3lf |\n",(*T),(*HITUNG1));
    if ((*ptr).k==1) printf("|    %10.3lf    |\n",(*T));
    for ((*ptr).i=0; (*ptr).i<(*tampil); (*ptr).i++)
    {
      fprintf(f2,"------");
      if ((*ptr).k==1) printf("------");
    }
    fprintf(f2,"------------------------------------------------------------
\n");
    if ((*ptr).k==1) printf("-------------------------------------\n");
    fprintf(f2,"\nPenerimaan rute sesuai daya angkut kendaraan pengirim\n");
    fprintf(f2,"------------------------------------------------------------
------------\n");
    fprintf(f2,"|    Rute    | Diterima / Ditolak | Kandaraan Angkut |
Total Pinalty   |\n");
    fprintf(f2,"------------------------------------------------------------
------------\n");
    (*T)=0;
    for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
    {
      (*jumlah)=0;
      fprintf(f2,"|     %c     |",65+(*ptr).i);
      for ((*ptr).j=0; (*ptr).j<(*ptr).top[(*ptr).i]; (*ptr).j++)
          (*jumlah)+=(*ptr).Jarak[(*ptr).s[(*ptr).i][(*ptr).j]]
[(*ptr).s[(*ptr).i][(*ptr).j+1]];
      if ((*ptr).TERIMA[(*ptr).i]!=-1)
      {
         fprintf(f2,"      Diterima      |      %5d
|",(*ptr).TERIMA[(*ptr).i]+1);
         fprintf(f2,"            -       |\n");
      }
      else
      {
         fprintf(f2,"      Ditolak       |        -         |");
         fprintf(f2,"    %15.3lf |\n",(*jumlah)+(*DENDA));
         (*T)+=(double)(*jumlah)+(*DENDA);
      }
    }
    fprintf(f2,"------------------------------------------------------------
------------\n");
```

```
     fprintf(f2,"|                                                                |
%15.3lf |\n",(*T));
     fprintf(f2,"----------------------------------------------------------------
------------\n");
     if ((f1=fopen("BIAYA.TXT", "r+"))!=NULL)
     {
      fscanf(f1,"%lf",&(*X));
      fclose(f1);
      (*T)=0;
      fprintf(f2,"\nBiaya Per Km = Rp. %15.2lf\n",(*X));
      fprintf(f2,"-----------------------------------\n");
      fprintf(f2,"|   Rute    |  Total Biaya  (Rp)  |\n");
      fprintf(f2,"-----------------------------------\n");
      printf("\n\nBiaya Per Km = Rp. %15.2lf\n",(*X));
      printf("-----------------------------------\n");
      printf("|   Rute    |  Total Biaya  (Rp)  |\n");
      printf("-----------------------------------\n");
      for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
      {
          (*jumlah)=0;
          fprintf(f2,"|     %c     |",65+(*ptr).i);
          if ((*ptr).k==1) printf("|     %c     |",65+(*ptr).i);
          for ((*ptr).j=0; (*ptr).j<(*ptr).top[(*ptr).i]; (*ptr).j++)
            (*jumlah)+=(*ptr).Jarak[(*ptr).s[(*ptr).i][(*ptr).j]]
[(*ptr).s[(*ptr).i][(*ptr).j+1]];
          if ((*ptr).TERIMA[(*ptr).i]==-1)
             (*jumlah)+=(*DENDA);
          (*jumlah) =ceil((*jumlah)*1000);
          (*jumlah) =floor((*jumlah)/10);
          (*jumlah) *=10;
          (*Y)=(double)(*jumlah)*(*X);
          (*Y)=ceil((*Y)*100);
          (*Y)/=100;
          (*Y)/=1000;
          (*T)+=(*Y);
          fprintf(f2,"%20.2lf |\n",(*Y));
          if ((*ptr).k==1) printf("%20.2lf |\n",(*Y));
      }
      fprintf(f2,"-----------------------------------\n");
      printf("-----------------------------------\n");
      fprintf(f2,"| Total Biaya%20.2lf |\n",(*T));
      printf("| Total Biaya%20.2lf |\n",(*T));
      fprintf(f2,"-----------------------------------");
      printf("-----------------------------------");
     }
     else
      printf("\nTabel Biaya Tidak Dapat Ditampilkan");
     CekTerima(f2,(*ptr).TERIMA,(*Lanjut),(*SumRute));
     fclose(f2);
// AKHIR DARI ALGORITMA GREEDY / NEASERT NEIGHBOUR SEARCH

// ALGORITMA SIMULATED ANNEALING (SA)
   if ((*Lanjut)==1)
   {
     f2=fopen("SA.TXT", "w+");
     // Step 1
     // Ambil Data di FILE Data.txt
     f1=fopen("RUTE.TXT","r+");
```

```
     fscanf(f1,"%d",&(*SumRute));
     fclose(f1);
     f1=fopen("DATA.TXT", "r+");
     fscanf(f1,"%d",&(*SumNode));
     fprintf(f2,"ALGORITMA SIMULATED ANNEALING (SA)\n");
     fprintf(f2,"----------------------------------\n\n\n");
     fprintf(f2,"Jumlah Rute          : %3d\n",(*SumRute));
     fprintf(f2,"Jumlah Distributor   : %3d\n",(*SumNode));
     double *MOBIL;
     MOBIL =new (double);
     if ((f3=fopen("MOBIL.TXT","r+"))!=NULL)
     {
      fscanf(f3,"%d",&(*ptr).j);
      fprintf(f2,"Jumlah Jenis Mobil   : %3d\n\n",(*ptr).j);
      fprintf(f2,"Daftar jenis Mobil berdasarkan daya angkut\n");
      fprintf(f2,"-----------------------------------\n");
      fprintf(f2,"| Jenis Mobil | Daya Angkut Mobil |\n");
      fprintf(f2,"-----------------------------------\n");
      for ((*ptr).i=0; (*ptr).i<(*ptr).j; (*ptr).i++)
      {
          fscanf(f3,"%lf",&(*MOBIL));
          fprintf(f2,"|   %6d    |  %15.3lf  |\n",(*ptr).i+1,(*MOBIL));
      }
      fprintf(f2,"-----------------------------------\n\n");
      fclose(f3);
     }
     delete (MOBIL);
     fprintf(f2,"Depot/titik pusat :\n");
     fprintf(f2,"-------------------------------------------------------------
\n");
     fprintf(f2,"|                      L o k a s i                        | Node
|\n");
     fprintf(f2,"-------------------------------------------------------------
\n");
     fscanf(f1,"%s",&(*ptr).Nama);
     fprintf(f2,"| %-50s | %3d  |\n",(*ptr).Nama,0);
     fprintf(f2,"-------------------------------------------------------------
\n\n");
     fprintf(f2,"Daerah pemasaran / titik tujuan :\n");
     fprintf(f2,"-------------------------------------------------------------
------------------\n");
     fprintf(f2,"|                      L o k a s i                        | Node |
Jumlah Order  |\n");
     fprintf(f2,"-------------------------------------------------------------
------------------\n");
     for ((*ptr).i=1; (*ptr).i<=(*SumNode); (*ptr).i++)
     {
       fflush(stdin);
       fscanf(f1,"%s\n",&(*ptr).Nama);
       fprintf(f2,"| %-50s | %3d  | %15.3lf
|\n",(*ptr).Nama,(*ptr).i,(*ptr).Order[(*ptr).i]);
     }
     fprintf(f2,"-------------------------------------------------------------
------------------\n\n");
     fflush(stdin);
     fprintf(f2,"Jarak Antar titik Lokasi (km)\n");
     for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
       fprintf(f2,"------------");
```

```
      fprintf(f2,"----------\n");
      fprintf(f2,"| Lokasi |");
      for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
        fprintf(f2,"%10d |",(*ptr).i);
      fprintf(f2,"\n");
      for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
        fprintf(f2,"------------");
      fprintf(f2,"----------\n");
      for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
      {
        fprintf(f2,"|   %3d    |",(*ptr).i);
        for ((*ptr).j=0; (*ptr).j<=(*SumNode); (*ptr).j++)
        {
            fscanf(f1,"%f",&(*ptr).Jarak[(*ptr).i][(*ptr).j]);
            fprintf(f2,"%10.3f |",(*ptr).Jarak[(*ptr).i][(*ptr).j]);
        }
        fscanf(f1,"\n");
        fprintf(f2,"\n");
      }
      for ((*ptr).i=0; (*ptr).i<=(*SumNode); (*ptr).i++)
        fprintf(f2,"------------");
      fprintf(f2,"----------\n\n");
      fclose(f1);
      fprintf(f2,"Input f(i) yaitu solusi dari Algoritma GREEDY / NEAREST
NEIGHBORHOOD SEARCH\n");

TampilTabel((*ptr).s,(*ptr).top,f2,(*ptr).Jarak,(*SumRute),(*SumMobil),(*ptr).
TERIMA,(*tampil),(*DENDA),(*ptr).Order,(*ptr).Kapasitas);

TabelBiaya((*ptr).s,(*ptr).top,f2,(*ptr).Jarak,(*SumRute),(*ptr).TERIMA,(*DEND
A));
      CekTerima(f2,(*ptr).TERIMA,(*Lanjut),(*SumRute));
      // Step 2
      fflush(stdin);
      fscanf(f4,"%lf",&(*Tawal));
      fscanf(f4,"%lf",&(*Takhir));
      fscanf(f4,"%lf",&(*A));
      fscanf(f4,"%d",&(*ntemp));
      fprintf(f2,"\n\nParameter Algoritma SA\n");
      fprintf(f2,"----------------------\n\n");
      fprintf(f2,"T awal       : %10.3lf\n",(*Tawal));
      fprintf(f2,"T akhir      : %10.3lf\n",(*Takhir));
      fprintf(f2,"a(T)         : %10.3lf\n",(*A));
      fprintf(f2,"n Temperatur : %10d  \n\n",(*ntemp));
      // Set T=Tawal
      (*T)=(*Tawal);
      delete (Tawal);
      // salin data pada algoritma greedy untuk di proses
      for ((*ptr).i=0; (*ptr).i<MaxRute; (*ptr).i++)
      {
        for ((*ptr).j=0; (*ptr).j<=MaxNode; (*ptr).j++)
            (*ptr).sHasil[(*ptr).i][(*ptr).j]=(*ptr).s[(*ptr).i][(*ptr).j];
        (*ptr).topHasil[(*ptr).i]=(*ptr).top[(*ptr).i];
      }
      // Step 3
      do
      {
       (*N) = 0;
```

```
      // Step 4
      do
      {
        fprintf(f2,"\nN = %5d",(*N));
        fprintf(f2,"\nT = %10.3lf",(*T));
        // Step 4.1
        // salin data Hasil -> Temp
        for ((*ptr).i=0; (*ptr).i<MaxRute; (*ptr).i++)
        {
            for ((*ptr).j=0; (*ptr).j<=MaxNode; (*ptr).j++)

(*ptr).sTemp[(*ptr).i][(*ptr).j]=(*ptr).sHasil[(*ptr).i][(*ptr).j];
            (*ptr).topTemp[(*ptr).i]=(*ptr).topHasil[(*ptr).i];
        }
        for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
        {
            if ((*ptr).topTemp[(*ptr).i]+1>3)
            {
             (*ACAK1) =random((*ptr).topTemp[(*ptr).i]-2);
             (*CADANG)=(*ptr).sTemp[(*ptr).i][(*ACAK1)+1];

(*ptr).sTemp[(*ptr).i][(*ACAK1)+1]=(*ptr).sTemp[(*ptr).i][(*ACAK1)+2];
             (*ptr).sTemp[(*ptr).i][(*ACAK1)+2]=(*CADANG);
            }
        }
        // Tampil Hasil Random
        fprintf(f2,"\n\nSimulated Annealing (SA) level 1\n");

TampilTabel((*ptr).sTemp,(*ptr).topTemp,f2,(*ptr).Jarak,(*SumRute),(*SumMobil)
,(*ptr).TERIMA,(*tampil),(*DENDA),(*ptr).Order,(*ptr).Kapasitas);
        CekTerima(f2,(*ptr).TERIMA,(*Lanjut),(*SumRute));
        // Step 4.2
        // Hitung Delta=Baru-Lama
        HitungT
((*TBARU),(*ptr).topTemp,(*ptr).sTemp,(*SumRute),(*ptr).Jarak,(*ptr).TERIMA,(*
DENDA));
        for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
            (*ptr).TERIMA[(*ptr).i]=0;
        HitungT
((*TLAMA),(*ptr).topHasil,(*ptr).sHasil,(*SumRute),(*ptr).Jarak,(*ptr).TERIMA,
(*DENDA));
        (*Delta) =(*TBARU)-(*TLAMA);
        fprintf(f2,"Delta  = %10.3lf - %10.3lf =
%10.3lf\n",(*TBARU),(*TLAMA),(*Delta));
        // Step 4.3
           if ((*Delta)<=0)
           {
            // sTemp diterima di sHasil sebagai level 1
            fprintf(f2,"\nKarena Delta<=0 maka Diterima Sebagai Rute Baru\n");
            for ((*ptr).i=0; (*ptr).i<MaxRute; (*ptr).i++)
            {
                for ((*ptr).j=0; (*ptr).j<=MaxNode; (*ptr).j++)

      (*ptr).sHasil[(*ptr).i][(*ptr).j]=(*ptr).sTemp[(*ptr).i][(*ptr).j];
                (*ptr).topHasil[(*ptr).i]=(*ptr).topTemp[(*ptr).i];
            }
           }
           else
```

```
            {
             // Generate Random R(0,1)
             (*ACAK1)  =random(10000);
             (*HITUNG) =(double)(*ACAK1)/10000.0;
             (*HITUNG1)=exp( -(double)(*Delta) /(double)(*T) );
             fprintf(f2,"\nGenerate Random R(0,1) = %10.4lf",(*HITUNG));
             fprintf(f2,"\nExp ( - Delta / T )    = %10.4lf",(*HITUNG1));
             if ( (*HITUNG)<(*HITUNG1) )
             {
                // sTemp Diterima  sebagai solusi sHasil
                fprintf(f2,"\nKarena R(0,1) < Exp (- Delta / T ) maka Rute
Diterima Sebagai Rute Baru\n");
                for ((*ptr).i=0; (*ptr).i<MaxRute; (*ptr).i++)
                {
                    for ((*ptr).j=0; (*ptr).j<=MaxNode; (*ptr).j++)

(*ptr).sHasil[(*ptr).i][(*ptr).j]=(*ptr).sTemp[(*ptr).i][(*ptr).j];
                    (*ptr).topHasil[(*ptr).i]=(*ptr).topTemp[(*ptr).i];
                }
             }
             else
                // sTemp Tidak diterima sebagai solusi
                fprintf(f2,"\nKarena R(0,1) >= Exp (- Delta / T ) maka Rute
Ditolak Sebagai Rute Baru\n");
            }
          // Step 6.1
          // salin data Hasil -> Temp
          for ((*ptr).i=0; (*ptr).i<MaxRute; (*ptr).i++)
          {
              for ((*ptr).j=0; (*ptr).j<=MaxNode; (*ptr).j++)

(*ptr).sTemp[(*ptr).i][(*ptr).j]=(*ptr).sHasil[(*ptr).i][(*ptr).j];
              (*ptr).topTemp[(*ptr).i]=(*ptr).topHasil[(*ptr).i];
          }
          if ((*SumRute)>1)
          {
             for ((*ptr).i=0; (*ptr).i<(*SumRute)-1; (*ptr).i++)
             {
               if ((*ptr).topTemp[(*ptr).i]+1>3)
                  (*ACAK1)=random((*ptr).topTemp[(*ptr).i]-2);
               if ((*ptr).topTemp[(*ptr).i+1]+1>3)
                  (*ACAK2)=random((*ptr).topTemp[(*ptr).i+1]-2);
               (*CADANG)  =(*ptr).sTemp[(*ptr).i][(*ACAK1)+1];
               (*ptr).sTemp[(*ptr).i
][(*ACAK1)+1]=(*ptr).sTemp[(*ptr).i+1][(*ACAK2)+1];
               (*ptr).sTemp[(*ptr).i+1][(*ACAK2)+1]=(*CADANG);
             }
          }
          // Tampil Hasil Random
          fprintf(f2,"\n\nSimulated Annealing (SA) level 2\n");

TampilTabel((*ptr).sTemp,(*ptr).topTemp,f2,(*ptr).Jarak,(*SumRute),(*SumMobil)
,(*ptr).TERIMA,(*tampil),(*DENDA),(*ptr).Order,(*ptr).Kapasitas);
          CekTerima(f2,(*ptr).TERIMA,(*Lanjut),(*SumRute));
          HitungT
((*TBARU),(*ptr).topTemp,(*ptr).sTemp,(*SumRute),(*ptr).Jarak,(*ptr).TERIMA,(*
DENDA));
          for ((*ptr).i=0; (*ptr).i<(*SumRute); (*ptr).i++)
```

```
            (*ptr).TERIMA[(*ptr).i]=0;
         HitungT
((*TLAMA),(*ptr).topHasil,(*ptr).sHasil,(*SumRute),(*ptr).Jarak,(*ptr).TERIMA,
(*DENDA));
         (*Delta) =(*TBARU)-(*TLAMA);
         fprintf(f2,"Delta  = %10.3lf - %10.3lf =
%10.3lf\n",(*TBARU),(*TLAMA),(*Delta));
         // Step 6.3
            if ((*Delta)<=0)
            {
             // sTemp diterima di sHasil sebagai level 1
             fprintf(f2,"\nKarena Delta<=0 maka Diterima Sebagai Rute Baru\n");
             for ((*ptr).i=0; (*ptr).i<MaxRute; (*ptr).i++)
             {
                 for ((*ptr).j=0; (*ptr).j<=MaxNode; (*ptr).j++)

       (*ptr).sHasil[(*ptr).i][(*ptr).j]=(*ptr).sTemp[(*ptr).i][(*ptr).j];
                 (*ptr).topHasil[(*ptr).i]=(*ptr).topTemp[(*ptr).i];
             }
            }
            else
            {
             // Generate Random R(0,1)
             (*ACAK1)  =random(10000);
             (*HITUNG) =(double)(*ACAK1)/(double)10000;
             (*HITUNG1)=exp(-(double)(*Delta)/(double)(*T));
             fprintf(f2,"\nGenerate Random R(0,1) = %10.4lf",(*HITUNG));
             fprintf(f2,"\nExp ( - Delta / T )    = %10.4lf",(*HITUNG1));
             if ( (*HITUNG)<(*HITUNG1) )
             {
                // sTemp Diterima  sebagai solusi sHasil
                fprintf(f2,"\nKarena R(0,1) < Exp (- Delta / T ) maka Rute
Diterima Sebagai Rute Baru\n");
                for ((*ptr).i=0; (*ptr).i<MaxRute; (*ptr).i++)
                {
                    for ((*ptr).j=0; (*ptr).j<=MaxNode; (*ptr).j++)

(*ptr).sHasil[(*ptr).i][(*ptr).j]=(*ptr).sTemp[(*ptr).i][(*ptr).j];
                    (*ptr).topHasil[(*ptr).i]=(*ptr).topTemp[(*ptr).i];
                }
             }
             else
                fprintf(f2,"\nKarena R(0,1) >= Exp (- Delta / T ) maka Rute
Ditolak Sebagai Rute Baru\n");
            }
         (*N) = (*N) +1;
       }while( (*N) < (*ntemp) );
       fprintf(f2,"\nN = %5d\n",(*N));
       (*T)=(*T)*(*A);
     }
     while ( (*T)>=(*Takhir));
     delete (Takhir);
     fprintf(f2,"T = %10.3lf\n",(*T));
     printf("\nTekan Sembarang Tombol");
     getch();
     fprintf(f2,"\n\nSimulated Annealing (SA)\n");
     printf("\n\nProses Simulated Annealing (SA) Selesai\n");
```

```
TampilTabel((*ptr).sHasil,(*ptr).topHasil,f2,(*ptr).Jarak,(*SumRute),(*SumMobi
l),(*ptr).TERIMA,(*tampil),(*DENDA),(*ptr).Order,(*ptr).Kapasitas);

TabelBiaya((*ptr).sHasil,(*ptr).topHasil,f2,(*ptr).Jarak,(*SumRute),(*ptr).TER
IMA,(*DENDA));
     printf("\nTekan Sembarang Tombol");
     fclose(f2);
     getch();
// AKHIR DARI ALGORITMA SIMULATED ANNEALING (SA)
   }
   else
   {
     printf("\nRute tidak feasible");
   }
  }
  else
  {
     clrscr();
     printf("Data Tidak Dapat diproses");
  }
  delete (Y);
  delete (X);
  delete (T);
  delete (DENDA);
  delete (TLAMA);
  delete (TBARU);
  delete (jumlah);
  delete (A);
  delete (Delta);
  delete (HITUNG);
  delete (HITUNG1);
  delete (HITUNG2);
  delete (SumRute);
  delete (SumNode);
  delete (SumMobil);
  delete (ntemp);
  delete (N);
  delete (tampil);
  delete (Lanjut);
  delete (ACAK1);
  delete (ACAK2);
  delete (CADANG);
  delete (arah);
  delete (ptr);
  getch();
}

void TampilTabel(
  int s[MaxRute][MaxNode+1],
  int top[MaxRute],
  FILE *f,
  float  Jarak[MaxNode+1][MaxNode+1],
  int SumRute,
  int SumMobil,
  int TERIMA[MaxRute],
  int tampil,
  double DENDA,
```

```
  double Order[MaxNode],
  double Kapasitas[MaxMobil])
{
  double *HITUNG, *HITUNG1, *HITUNG2, *jumlah;
  int    *i, *j;
  i       = new (int);
  j       = new (int);
  HITUNG  = new (double);
  HITUNG1 = new (double);
  HITUNG2 = new (double);
  jumlah  = new (double);
  for ( (*i)=0; (*i)<tampil; (*i)++)
      fprintf(f,"------");
  fprintf(f,"-------------------------------------------------------------\n");
  fprintf(f,"|    Rute   | Susunan  ");
  for ( (*i)=0; (*i)<tampil-1; (*i)++)
      fprintf(f,"      ");
  fprintf(f,"  | Total Jarak (km) | Volume kirim m3 |\n");
  for ( (*i)=0; (*i)<tampil; (*i)++)
      fprintf(f,"------");
  fprintf(f,"-------------------------------------------------------------\n");
  (*HITUNG )=0;
  (*HITUNG1)=0;
  for ( (*i)=0; (*i)<SumRute; (*i)++)
  {
       (*jumlah) =0;
       TERIMA[(*i)] =-1;
       fprintf(f,"|     %c     |",65+(*i));
       (*HITUNG2)=0;
       for ( (*j)=0; (*j)<top[(*i)]; (*j)++)
       {
           (*jumlah)+=Jarak[s[(*i)][(*j)]] [s[(*i)][(*j)+1]];
           fprintf(f," %3d -",s[(*i)][(*j)]);
           (*HITUNG2)+=Order[s[(*i)][(*j)]];
       }
       (*HITUNG1)+=(*HITUNG2);
       fprintf(f," %3d  ",s[(*i)][top[(*i)]]);
       for (;(*j)<tampil; (*j)++)
           fprintf(f,"      ");

       for ( (*j)=0; (*j)<SumMobil; (*j)++)
           if ((*HITUNG2)<=Kapasitas[(*j)])
           {
            TERIMA[(*i)]=(*j);
            break;
           }
       fprintf(f,"|    %10.3lf    | %15.3lf |\n",(*jumlah),(*HITUNG2));
       (*HITUNG)+=(double)(*jumlah);
  }
  for ( (*i)=0; (*i)<tampil; (*i)++)
      fprintf(f,"------");
  fprintf(f,"-------------------------------------------------------------\n");
  fprintf(f,"|                    ");
  for ( (*i)=0; (*i)<tampil; (*i)++)
      fprintf(f,"      ");
  fprintf(f,"|    %10.3lf    | %15.3lf |\n",(*HITUNG),(*HITUNG1));
  for ( (*i)=0; (*i)<tampil; (*i)++)
      fprintf(f,"------");
```

```
  fprintf(f,"-------------------------------------------------------\n");
  fprintf(f,"\nPenerimaan rute sesuai daya angkut kendaraan pengirim\n");
  fprintf(f,"-------------------------------------------------------------------
---------\n");
  fprintf(f,"|    Rute    | Diterima / Ditolak | Kandaraan Angkut |    Total
Pinalty   |\n");
  fprintf(f,"-------------------------------------------------------------------
---------\n");
  (*HITUNG)=0;
  for ( (*i)=0; (*i)<SumRute; (*i)++)
  {
       (*jumlah)=0;
       fprintf(f,"|      %c     |",65+(*i));
       for ( (*j)=0; (*j)<top[(*i)]; (*j)++)
           (*jumlah)+=Jarak[s[(*i)][(*j)]] [s[(*i)][(*j)+1]];
       if (TERIMA[(*i)]!=-1)
       {
          fprintf(f,"      Diterima      |      %5d       |",TERIMA[(*i)]+1);
          fprintf(f,"             -       |\n");
       }
       else
       {
          fprintf(f,"      Ditolak       |        -         |");
          fprintf(f,"    %15.3lf |\n",(*jumlah)+DENDA);
          (*HITUNG)+=(double)(*jumlah)+DENDA;
       }
  }
  fprintf(f,"-------------------------------------------------------------------
---------\n");
  fprintf(f,"|                                                    |    %15.3lf
|\n",(*HITUNG));
  fprintf(f,"-------------------------------------------------------------------
---------\n");
  delete(i);
  delete(j);
  delete(HITUNG);
  delete(HITUNG1);
  delete(HITUNG2);
  delete(jumlah);
}


void CekTerima(FILE *f, int TERIMA[MaxNode], int &Lanjut, int SumRute)
{
  int *i;
  i = new (int);
  Lanjut=1;
  for ( (*i)=0; (*i)<SumRute; (*i)++)
  {
      if (TERIMA[(*i)]==-1)
      {
       Lanjut=0;
       break;
      }
  }
  if (Lanjut==1)
     fprintf(f,"\nRute feasible\n\n");
  else
```

```
      fprintf(f,"\nRute tidak feasible\n\n");
  delete (i);
}

void HitungT (
      double &T,
      int top[MaxRute],
      int s[MaxRute][MaxNode+1],
      int SumRute,
      float  Jarak[MaxNode+1][MaxNode+1],
      int TERIMA[MaxRute],
      double DENDA)
{
  double *jumlah;
  int *i, *j;
  jumlah = new (double);
  i      = new (int);
  j      = new (int);
  T=0;
  for ( (*i)=0; (*i)<SumRute; (*i)++)
  {
      (*jumlah)=0;
      for ( (*j)=0; (*j)<top[(*i)]; (*j)++)
        (*jumlah)+=Jarak[s[(*i)][(*j)]] [s[(*i)][(*j)+1]];
      if (TERIMA[(*i)]==-1)
       (*jumlah)+=DENDA;
      T+=(*jumlah);
  }
  delete (jumlah);
  delete (i);
  delete (j);
}

void TabelBiaya(
  int s[MaxRute][MaxNode+1],
  int top[MaxRute],
  FILE *f2,
  float  Jarak[MaxNode+1][MaxNode+1],
  int SumRute,
  int TERIMA[MaxRute],
  double DENDA)
{
  FILE *f1;
  int *i, *j;
  double *T, *Y, *X, *jumlah;
  i      = new (int);
  j      = new (int);
  T      = new (double);
  Y      = new (double);
  X      = new (double);
  jumlah = new (double);
     if ((f1=fopen("BIAYA.TXT", "r+"))!=NULL)
     {
      fscanf(f1,"%lf",&(*X));
      fclose(f1);
      (*T) =0;
      fprintf(f2,"\nBiaya Per Km = Rp. %15.2lf\n",(*X));
      fprintf(f2,"-----------------------------------\n");
```

```
      fprintf(f2,"|   Rute    |  Total Biaya  (Rp)  |\n");
      fprintf(f2,"-----------------------------------\n");
      for ( (*i)=0; (*i)<SumRute; (*i)++)
      {
          (*jumlah) =0;
          fprintf(f2,"|      %c      |",65+(*i));
          for ( (*j)=0; (*j)<top[(*i)]; (*j)++)
            (*jumlah) +=Jarak[s[(*i)][(*j)]] [s[(*i)][(*j)+1]];
          if (TERIMA[(*i)]==-1)
             (*jumlah)+=DENDA;
          (*jumlah)=ceil((*jumlah)*1000);
          (*jumlah)=floor((*jumlah)/10);
          (*jumlah)*=10;
          (*Y)=(double)(*jumlah)*(*X);
          (*Y)=ceil((*Y)*100);
          (*Y)/=100;
          (*Y)/=1000;
          (*T)+=(*Y);
          fprintf(f2,"%20.2lf |\n",(*Y));
      }
      fprintf(f2,"-----------------------------------\n");
      fprintf(f2,"| Total Biaya%20.2lf |\n",(*T));
      fprintf(f2,"-----------------------------------");
     }
  delete(i);
  delete(j);
  delete(T);
  delete(Y);
  delete(X);
  delete(jumlah);
}

void UbahMenu1(unsigned char menu)
{
  switch (menu)
  {
    case 1 : gotoxy(28,13); printf("   Input Jarak dan Node   "); break;
    case 2 : gotoxy(28,14); printf("    Input Jumlah Order    "); break;
    case 3 : gotoxy(28,15); printf("     Input Jumlah Rute    "); break;
    case 4 : gotoxy(28,16); printf("    Input Biaya (Rp/Km)   "); break;
    case 5 : gotoxy(28,17); printf("      Input Data SA       "); break;
    case 6 : gotoxy(28,18); printf("      Input Pinalti       "); break;
    case 7 : gotoxy(28,19); printf("   Input Data Kendaraan   "); break;
    case 8 : gotoxy(28,20); printf("    Proses Perhitungan    "); break;
    case 9 : gotoxy(28,21); printf("        K e l u a r       "); break;
  }
}

void UbahMenu2(unsigned char menu)
{
  switch (menu)
  {
    case 1 : gotoxy(28,13); printf(" < Input Jarak dan Node >"); break;
    case 2 : gotoxy(28,14); printf(" <  Input Jumlah Order  >"); break;
    case 3 : gotoxy(28,15); printf(" <   Input Jumlah Rute  >"); break;
    case 4 : gotoxy(28,16); printf(" <  Input Biaya (Rp/Km) >"); break;
    case 5 : gotoxy(28,17); printf(" <    Input Data SA     >"); break;
    case 6 : gotoxy(28,18); printf(" <    Input Pinalti     >"); break;
```

```
    case 7 : gotoxy(28,19); printf(" < Input Data Kendaraan >");  break;
    case 8 : gotoxy(28,20); printf(" <  Proses Perhitungan  >");  break;
    case 9 : gotoxy(28,21); printf(" <      K e l u a r      >");  break;
  }
}

void InputData()
{
  float Jarak[MaxNode+1][MaxNode+1];
  char  Nama[100];
  int   *SumNode, *i, *j;
  FILE *f;
  SumNode = new (int);
  i       = new (int);
  j       = new (int);
  _setcursortype(_NORMALCURSOR);
  if ((f=fopen("DATA.TXT", "w+"))!=NULL)
  {
     clrscr();
     do
     {
       fflush(stdin);
       printf("Jumlah Distributor  (max %-3d ) : ",MaxNode);
       scanf("%d",&(*SumNode) );
     }while ( ((*SumNode)<=0) || ((*SumNode)>MaxNode) );
     fprintf(f,"%d\n",(*SumNode) );
     printf("\n\nLokasi tiap Node : \n\n");
     for ( (*i)=0; (*i)<=(*SumNode); (*i)++)
     {
       fflush(stdin);
       printf("Nama Lokasi ke - %2d : ",(*i) );
       // scanf("%s",&Nama);
       gets(Nama);
       for ( (*j)=0; (*j)<strlen(Nama); (*j)++)
           if (Nama[(*j)]==' ')
            Nama[(*j)]='_';
       fprintf(f,"%s\n",Nama);
     }
     printf("\n\nJarak Antar Titik Tujuan : \n\n");
     for ( (*i)=0; (*i)<(*SumNode); (*i)++)
     {
       for ( (*j)=(*i)+1; (*j)<=(*SumNode); (*j)++)
           do
           {
            printf("Jarak Antara Lokasi %3d - %3d (km) : ",(*i),(*j));
            scanf("%f",&Jarak[(*i)][(*j)]);
           }
           while (Jarak[(*i)][(*j)]<=0);
       printf("\n");
     }
     for ( (*i)=0; (*i)<=(*SumNode); (*i)++)
       for ( (*j)=(*i); (*j)<=(*SumNode); (*j)++)
           if ( (*i)!=(*j) )
            Jarak[(*j)][(*i)]=Jarak[(*i)][(*j)];
           else
            Jarak[(*i)][(*j)]=0;
     for ( (*i)=0; (*i)<=(*SumNode); (*i)++)
     {
```

```
      for ( (*j)=0; (*j)<=(*SumNode); (*j)++)
          fprintf(f,"%10.3f",Jarak[(*i)][(*j)]);
      fprintf(f,"\n");
    }
  }
  fclose(f);
  delete (SumNode);
  delete (i);
  delete (j);
}

void InputRute()
{
  FILE *f;
  int *SumRute;
  SumRute = new (int);
  if ((f=fopen("RUTE.TXT", "w+"))!=NULL)
  {
     clrscr();
     do
     {
       fflush(stdin);
       printf("Jumlah Rute          (max %-3d ) : ",MaxRute);
       scanf("%d",&(*SumRute));
     }while (((*SumRute)<=0) || ((*SumRute)>MaxRute) );
     fprintf(f,"%d\n",(*SumRute));
  }
  fclose(f);
  delete (SumRute);
}

void InputBiayaPerKm()
{
  FILE *f;
  double *data;
  data = new (double);
  _setcursortype(_NORMALCURSOR);
  if ((f=fopen("BIAYA.TXT", "w+"))!=NULL)
  {
     clrscr();
     do
     {
       printf("Biaya Per Km : Rp. ");
       scanf("%lf",&(*data));
     }while ((*data)<=0);
     fprintf(f,"%20.2lf",(*data));
     fclose(f);
  }
  delete (data);
}

void InputPinalti()
{
  double *denda, *max;
  denda  = new (double);
  max    = new (double);
  (*max) =10000000000.0;
  FILE *f;
```

```
  if ((f=fopen("DENDA.TXT", "w+"))!=NULL)
  {
     clrscr();
     do
     {
       fflush(stdin);
       printf("Jumlah Denda (max %12.2lf ) : ",(*max));
       scanf("%lf",&(*denda));
     }while (((*denda)<=0)||((*denda)>(*max)));
     fprintf(f,"%lf",*denda);
  }
  fclose(f);
  delete (denda);
  delete (max);
}

void InputPermintaan()
{
  FILE *f, *f1;
  int *i, *SumNode;
  double *besar;
  char nama[100];

  i       = new (int);
  SumNode = new (int);
  besar   = new (double);

  _setcursortype(_NORMALCURSOR);
  if (((f=fopen("ORDER.TXT", "w+"))!=NULL)&&((f1=fopen("DATA.TXT",
"r+"))!=NULL))
  {
     clrscr();
     fscanf(f1,"%d",&(*SumNode));
     for ((*i)=0; (*i)<=(*SumNode); (*i)++)
     {
       fscanf(f1,"%s",&nama);
       if ((*i)!=0)
       {
          printf("\n%s\n",nama);
          printf("Jumlah Order   : ");
          scanf("%lf",&(*besar));
       }
       else
          (*besar)=0;
       fprintf(f,"%lf\n",(*besar));
     }
  }
  fprintf(f,"%lf\n",(*besar));
  fclose(f);
  fclose(f1);

  delete (i);
  delete (SumNode);
  delete (besar);
}

void InputDataMobil()
{
```

```
_setcursortype(_NORMALCURSOR);
FILE   *f;
int    *SumMobil, *i;
double *DayaAngkut;
SumMobil    = new(int);
i           = new(int);
DayaAngkut = new(double);

if ((f=fopen("MOBIL.TXT", "w+"))!=NULL)
{
   clrscr();
   do
   {
    printf("Jumlah Mobil ( Max %4d )  : ",MaxMobil);
    scanf("%d",&(*SumMobil));
   }while (((*SumMobil)<=0)||((*SumMobil)>MaxMobil));
   fprintf(f,"%d\n",(*SumMobil));
   for ((*i)=0; (*i)<(*SumMobil); (*i)++)
   {
     printf("Daya Angkut untuk Mobil %3d : ",(*i)+1);
     scanf("%lf",&(*DayaAngkut));
     fprintf(f,"%lf\n",(*DayaAngkut));
   }
   fclose(f);
 }
 delete(SumMobil);
 delete(i);
 delete(DayaAngkut);
}

void InputDataSA()
{
  double *Tawal, *Takhir, *A;
  int    *ntemp;
  FILE *f;
  Tawal  = new (double);
  Takhir = new (double);
  A      = new (double);
  ntemp  = new (int);

   _setcursortype(_NORMALCURSOR);
   if ((f=fopen("INPUT.TXT", "w+"))!=NULL)
   {
      clrscr();
      printf("Inputkan Data berikut : \n");
      printf("T awal       : ");     scanf("%lf",&(*Tawal));
fflush(stdin);
      printf("T akhir      : ");     scanf("%lf",&(*Takhir));
fflush(stdin);
      printf("a(T)         : ");     scanf("%lf",&(*A));
fflush(stdin);
      printf("n Temperatur : ");     scanf("%d",&(*ntemp));
fflush(stdin);

       fprintf(f,"%10.5lf",(*Tawal));
       fprintf(f,"%10.5lf",(*Takhir));
       fprintf(f,"%10.5lf",(*A));
       fprintf(f,"%6d",(*ntemp));
```

```
    fclose(f);
  }
  delete (Tawal);
  delete (Takhir);
  delete (A);
  delete (ntemp);
}
```