Genetic Algorithm

generate initial population

▼

test the population for quality

select individual to reproduce

produce new variations of individuals

replace old individuals with new one – new generation

while not satisfied

test_population(model,p)

for i=1 to n

$$M(p_i) = simulate(model, parameters = p_i)$$

$$q_i = \sum_{j=1}^{m} (M(t_j, p_i) - data(t_j))^2$$

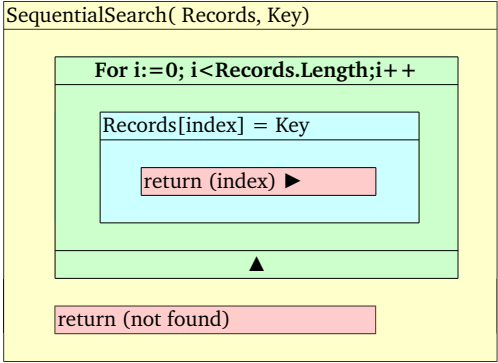
▲

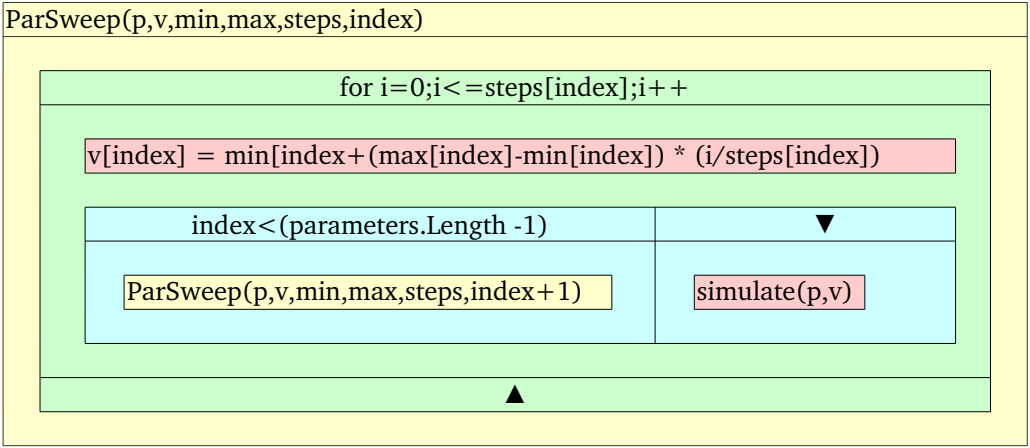
return(q)

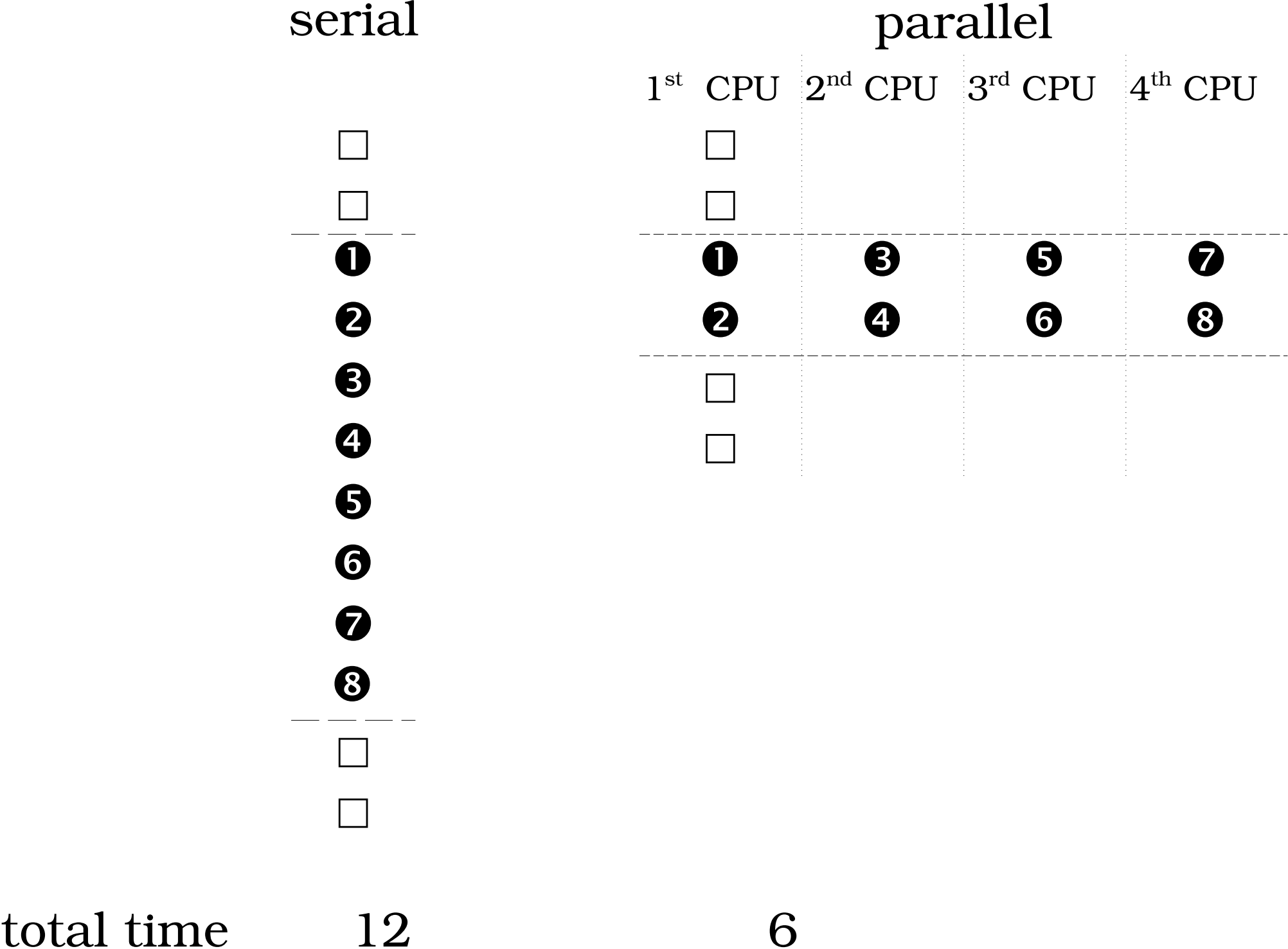
```
int function SequentialSearch(Array Records, int Key)
{
        for (int index=0;i<Records.Length;i++)
        {
                if (Records[index]=Key)
                {
                        return (index)
                }

        }

        return(not found)
}
```




ParSweep(p,v,min,max,steps,index)
for i=0;i<=steps[index];i++
v[index] = min[index+(max[index]-min[index]) * (i/steps[index])
index<(parameters.Length -1)
ParSweep(p,v,min,max,steps,index+1)
simulate(p,v)


serial
parallel
1st CPU
2nd CPU
3rd CPU
4th CPU
1
2
3
4
5
6
7
8
1
2
3
4
5
6
7
8
total time
12
6

	total time s	paralelizable	fraction alpha	theoretical spe
mysinc	73	20	0.726027397	1.377358491
MatejakAB201	211	197	0.066350711	15.07142857
Meurs	118	116	0.016949153	59
Hummod	721657	721243	0.00057368	1743.13285
	193895	193703	0.000990227	1009.869792
Hummod 10	847917	845454	0.002904765	344.2618758
Hummod 20	432509	430076	0.005625316	177.7677764

nove mereni ga na physiome, worker na metacloudu

Hummod 1	1217208	1215144	0.001695684	589.7325581
Meurs	104557	104328	0.002190193	456.580786

hummod 112776

nove mereni ga na physiome, worker na metacloudu	T1	T2	T3 request	T4 sim	gaoverhead
Hummod	4639676	4639265	4618282	4616566	411
Meurs	661817	661490	634694	634457	327
MatejakAB201	17868	17610	1399	1123	258

nove mereni ga na physiome, worker na physiome gen. 100 population 120

	T1	T2	T3	T4	gaoverhead
MatejakAB201	2893	2373	1228	1149	520
Hummod	6463217	6460937	6451079	6458253	2280
Meurs	699631	699228	697907	696948	403

protokol pro test na 16 procesorovych strojich

5	5	80
2*3	6	96
7	7	112
2*2*2	8	128
3*3*3	9	144
2*5	10	160
2*2*5	20	320
2*3*5	30	480
2*2*2*5	40	640

spolecny jmen 7560

pofdle gustafsona 640 population, 20 generations

	T(80)	T2(80)	beta	S(80)	S(160) theoret
HumMod	544539	542192	0.004310068	79.65950465	159.3146992
Meurs	90991	88685	0.025343166	77.9978899	155.9704366
MatejakAB201	11378	8875	0.219985938	62.62111092	125.0222359

pofdle gustafsona 640 popul	T(160)	T2(160)	beta	S(160)	S
hummod	286657	284277	0.008302606	158.6798857	161.8546207
meurs	96000	95000	0.010416667	158.34375	68.93927083
	151282	147324	0.02616306	155.8400735	

eedup overhead

s40	T(40)	S(40)
37.51881785	59152	20.57763051
36.8521782	7132	14.6602636

overhead in %	Network over	Network over	simulation in	alpha	S	T(10)	
8.8584E-005	20983	0.004522514	0.995019049	8.8584E-005	11288.74939		466241
0.000494094	26796	0.040488534	0.958659267	0.000494094	2023.905199		75938
0.014439221	16211	0.907264383	0.062849787	0.014439221	69.25581395		2386

gaoverhead%	network overh	Network over	simulation%	alpha	S	T2	
0.17974421	1145	0.395782924	0.397165572	0.17974421	5.563461538		1510
0.000352766	9858	0.001525247	0.999231961	0.000352766	2834.744298		
0.000576018	1321	0.001888138	0.996165121	0.000576018	1736.057072		

h

64 population 20 generations hummod 16 pop 20 generations

S(80) podle amdahl	T(1)	T2(1)	S(80)
85.20374115	34840000	34744960	63.98072498
72.73433636	5089230	5066250	55.93113605
15.70399016	189860	186750	16.68658815

S(160)
121.5389821
53.0128125
12.55007205

S(10)	T(20)	S(20)	T(30)	S(30)	T(40)	S(40)
9.951239809	226941	20.44441507	187049	24.804602	130999	35.41764441
8.715228212	39930	16.57443025	27091	24.4294046	22333	29.63403931
7.48868399	1512	11.81746032	1431	12.48637317	1160	15.40344828

S2	T3	S3	T4	S4
1.91589404				

T(50)	S(50)	T(60)	S(60)	T(80)	S(80)	Serialcomp =
110978	41.80716899	93110	49.83005048	66885	69.36795993	4618693
20112	32.90657319	17123	38.65076213	15121	43.76807089	635021
1138	15.70123023	1213	14.73042045	1121	15.93933988	1657

Serialcomp =
1748
6453359
698310

serialspeedup	Processorneeded p >= (1-alpha)/((T1-N3)/T1 – alpha)
1.00454306	1.004543464
1.04219703	1.04221877
10.78334339	12.58756254

serialspeedup	Processorneeded p >= (1-alpha)/((T1-N3)/T1 – alpha)
1.655034325	1.932410423
1.001527577	1.001528116
1.00189171	1.001892802