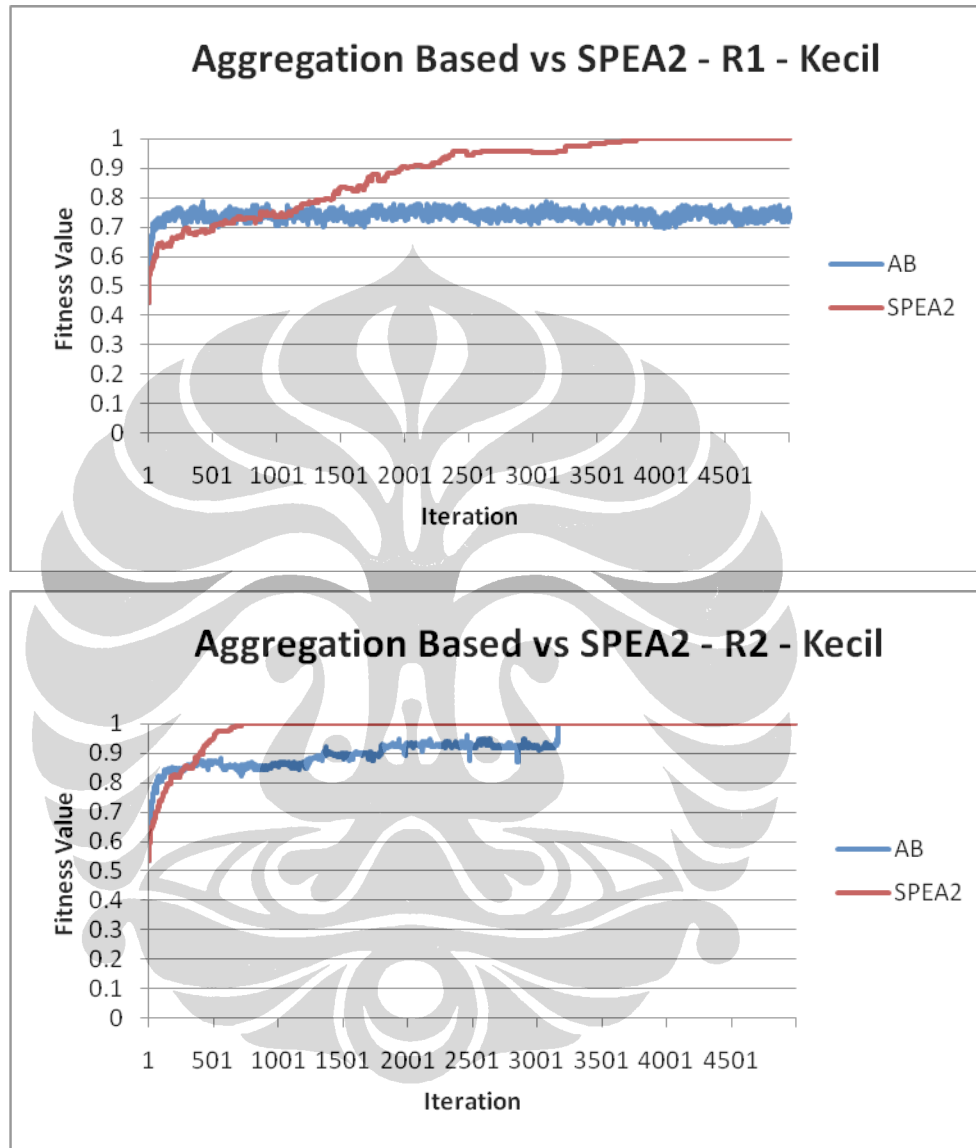
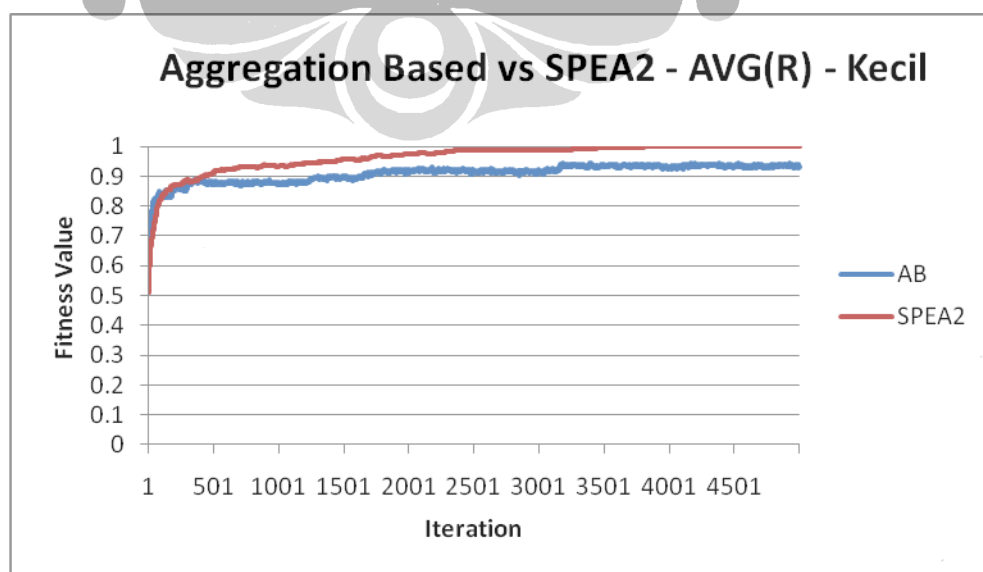
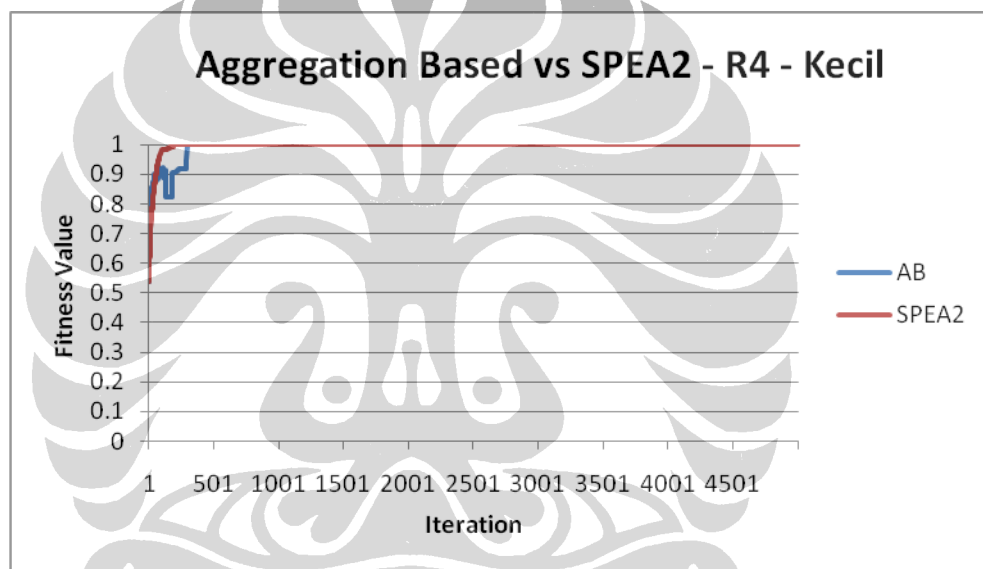
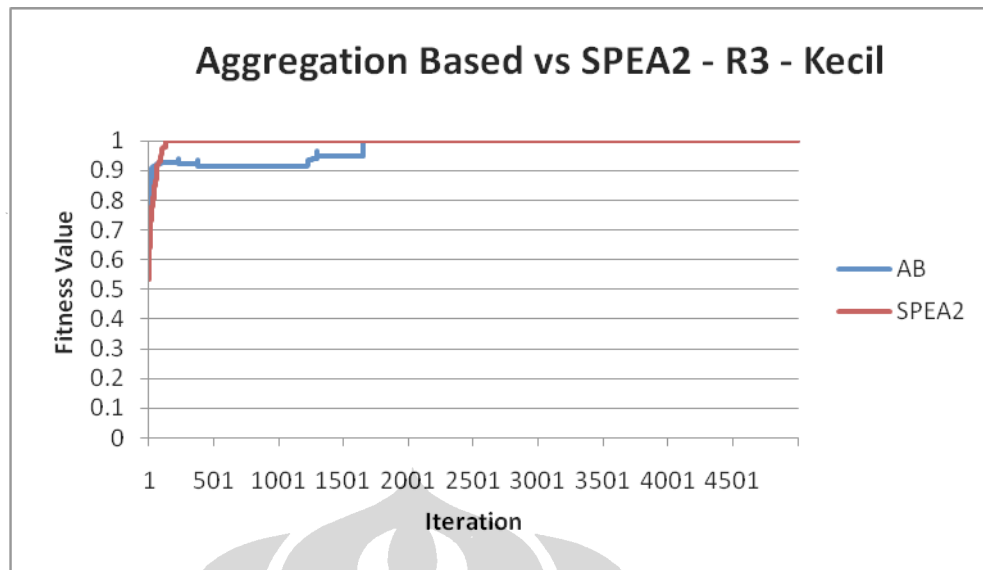
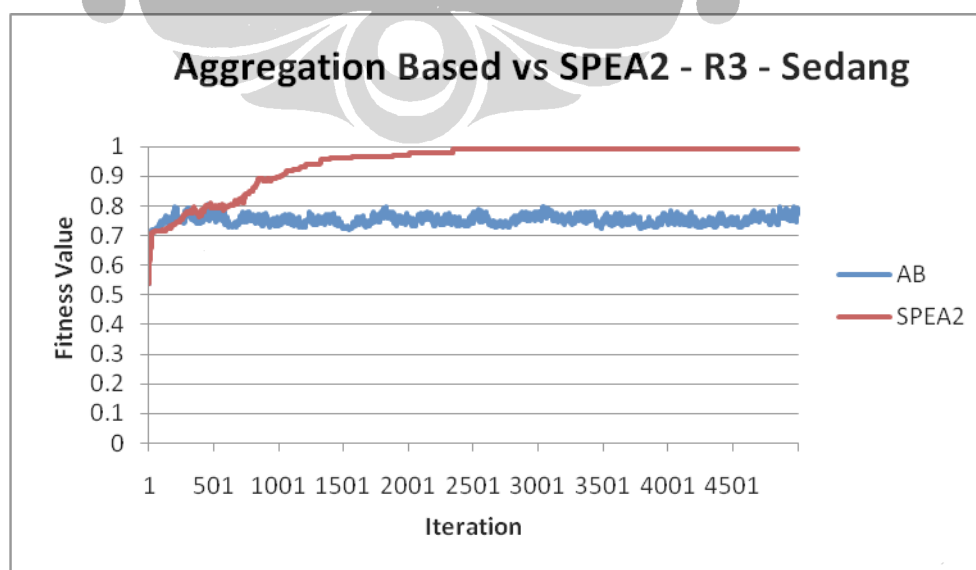
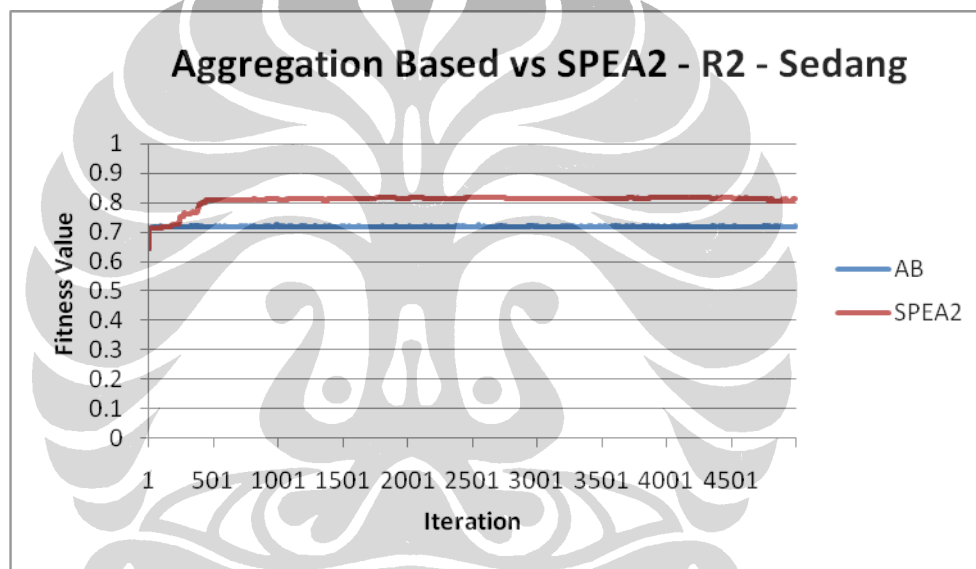
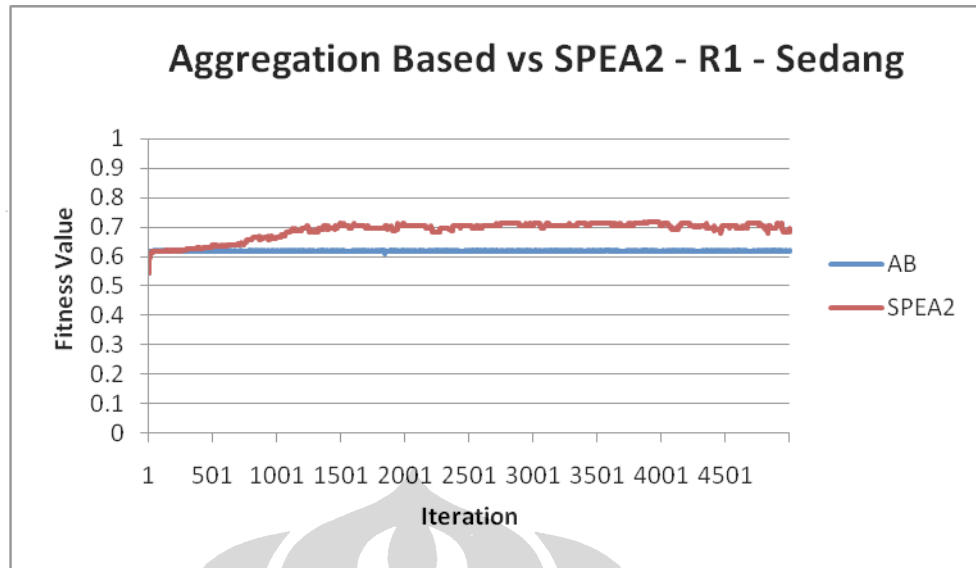


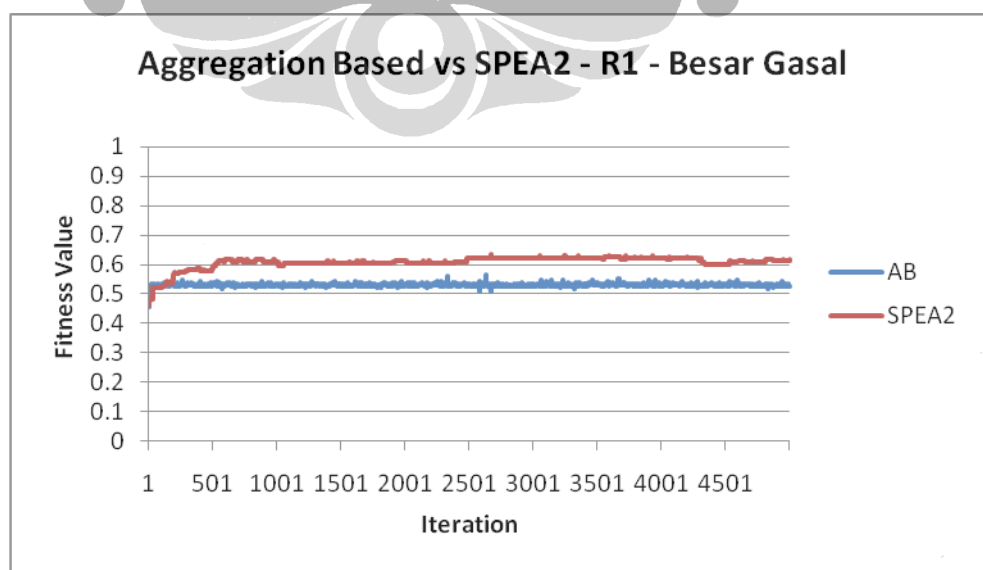
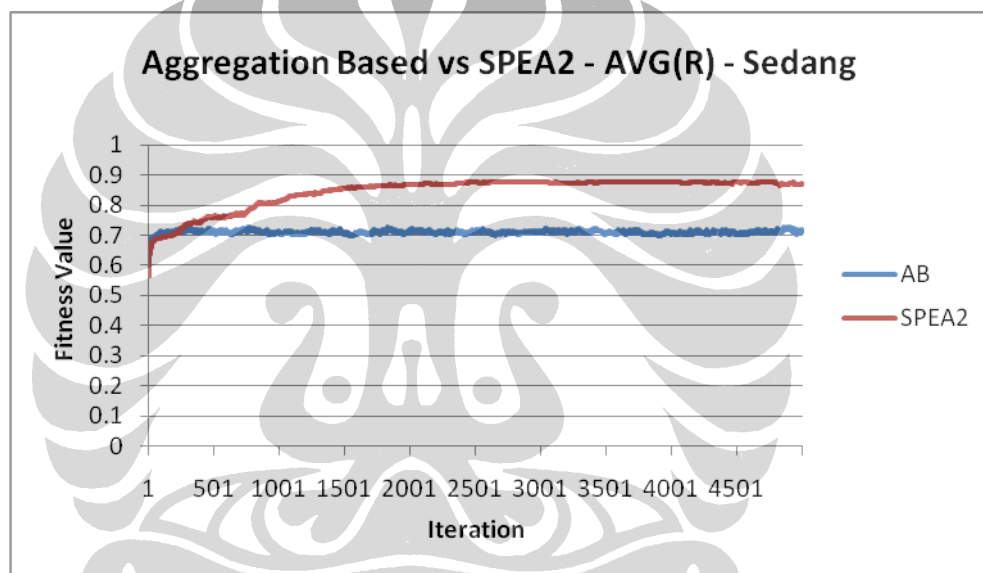
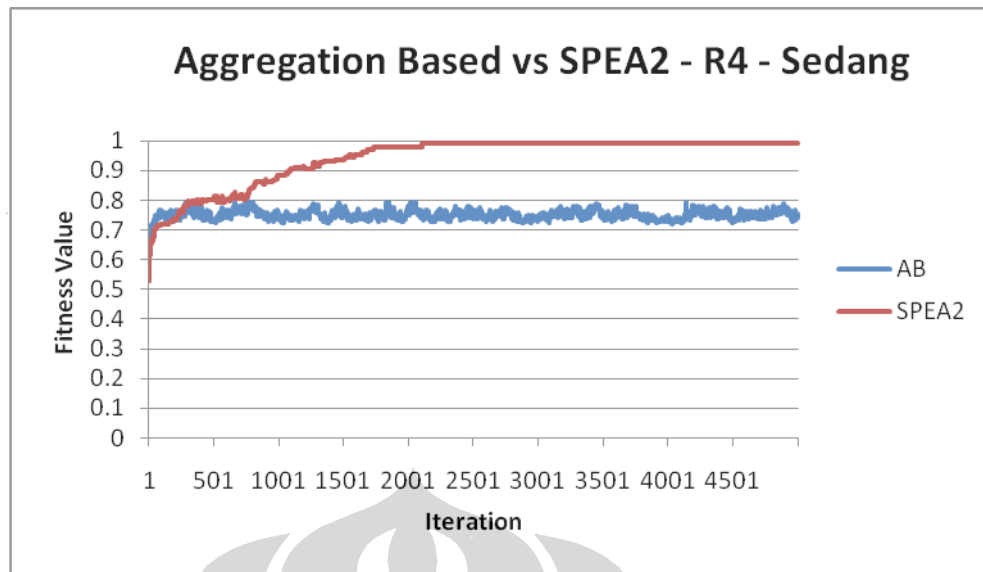
Lampiran A: Rekap Grafik Hasil Eksperimen

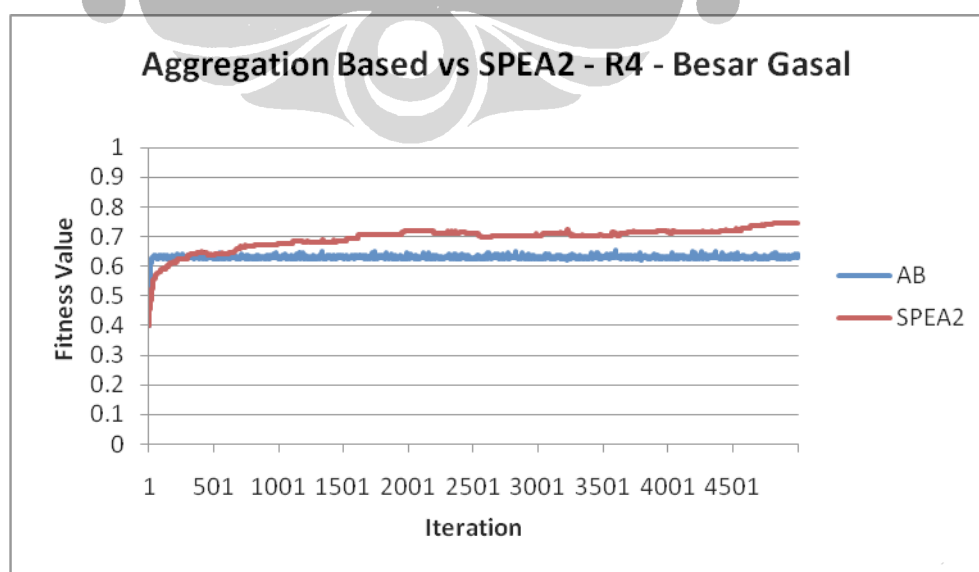
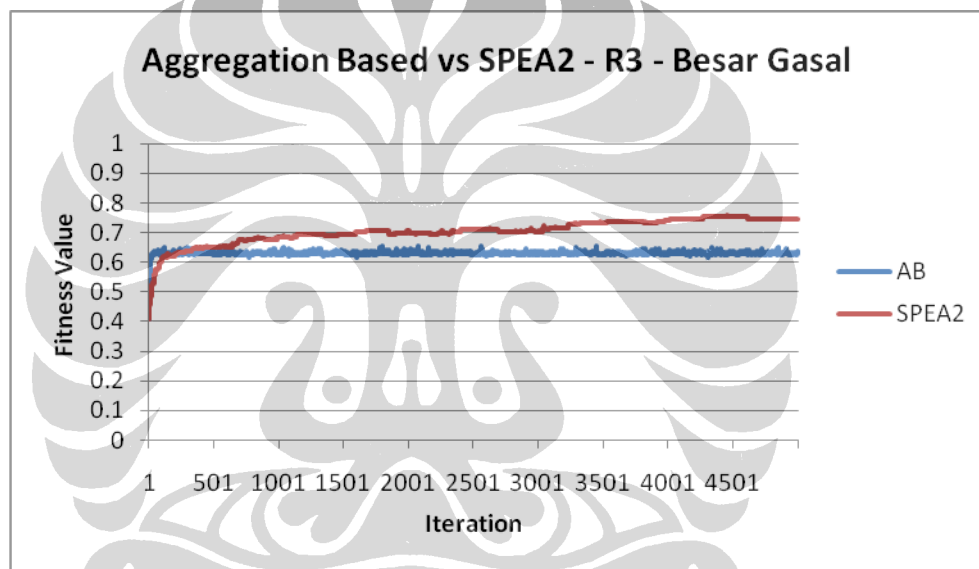
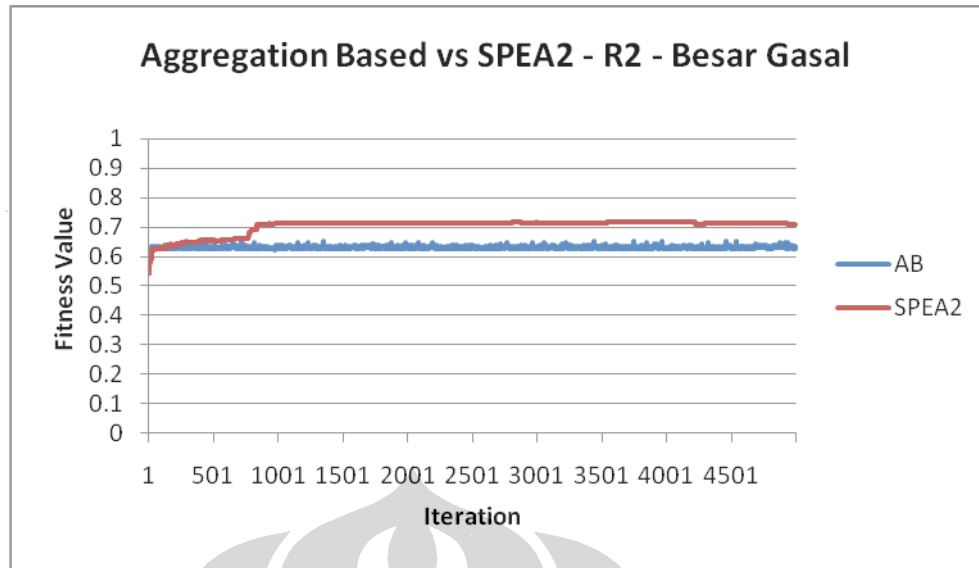
Arti dari singkatan yang digunakan pada grafik dapat dilihat pada Tabel 5.1.

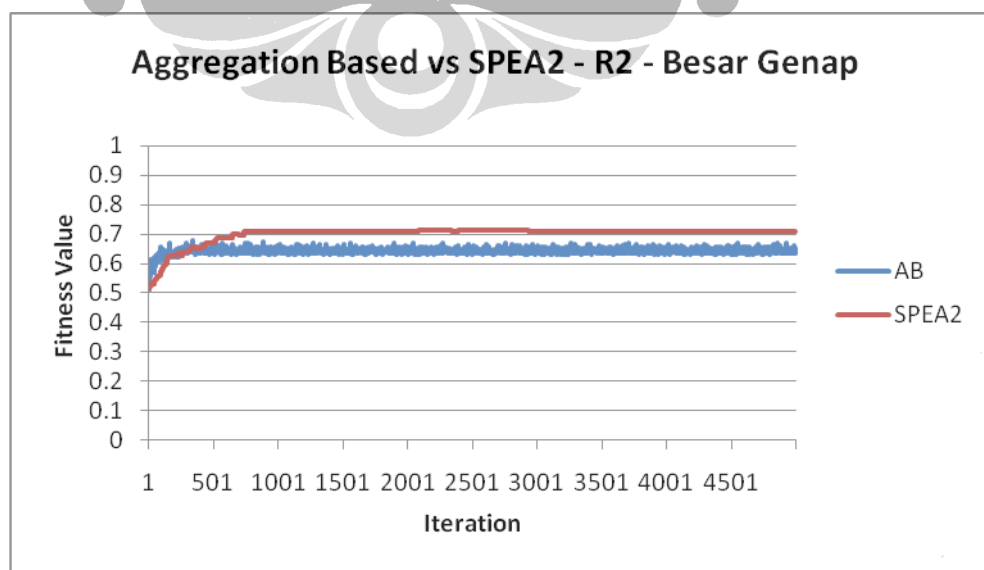
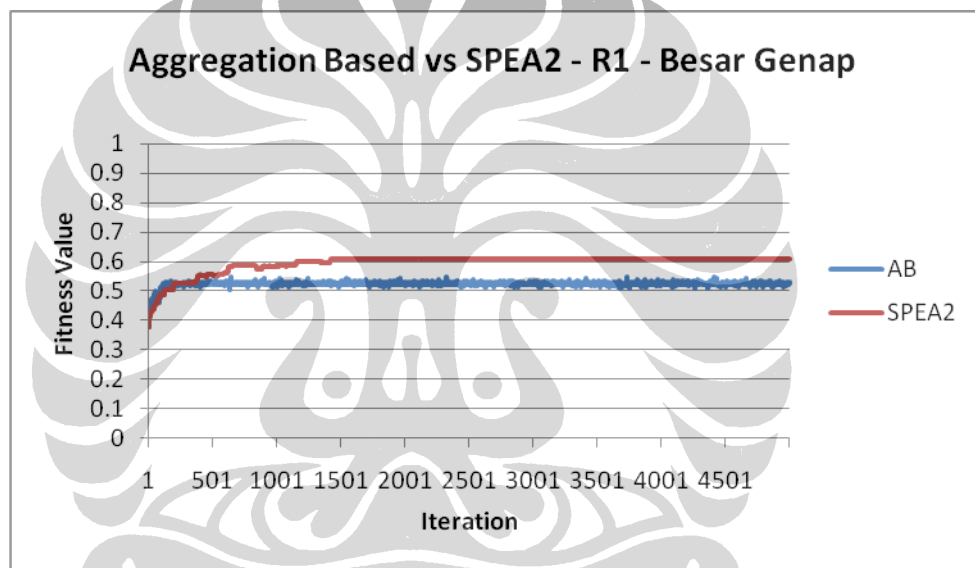
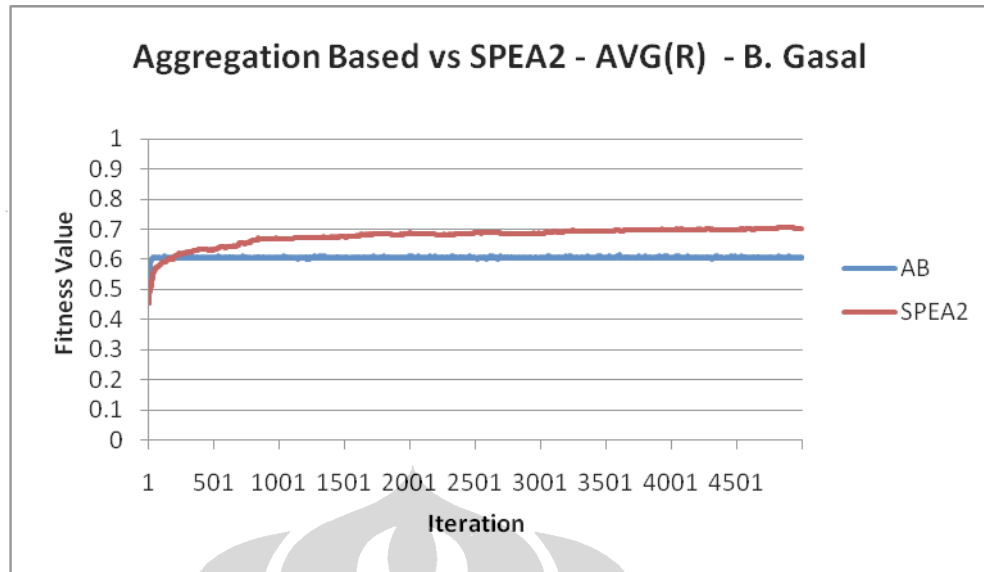


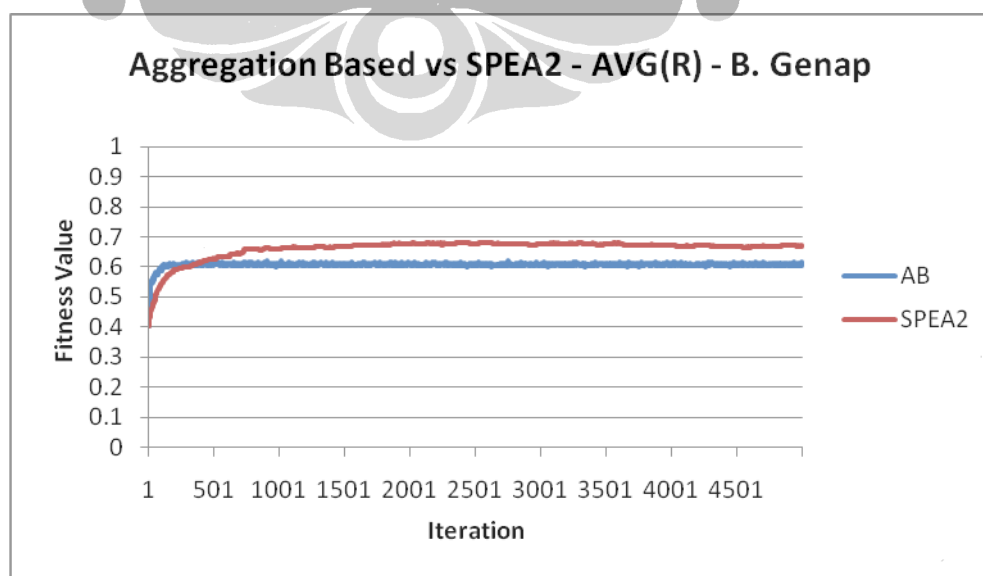
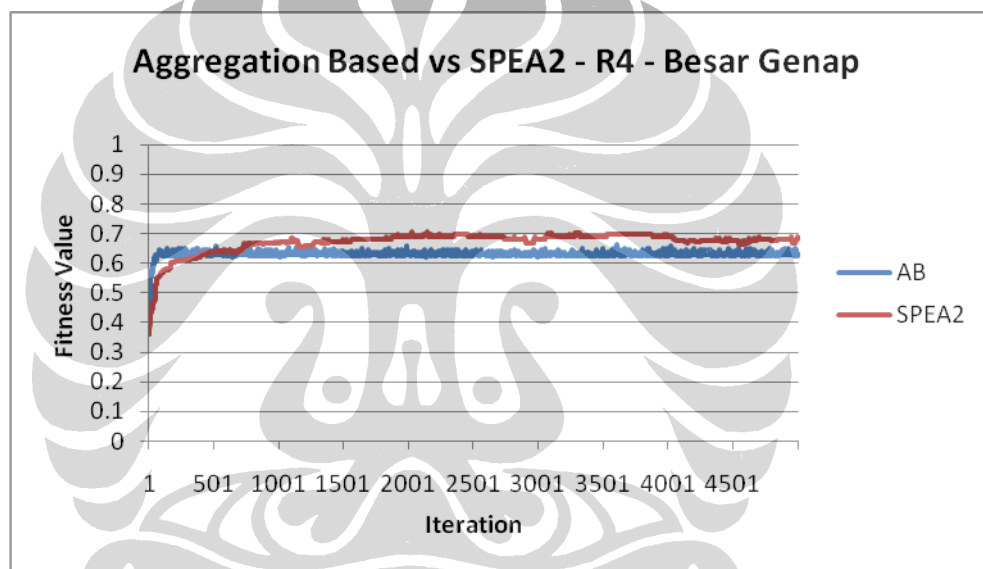
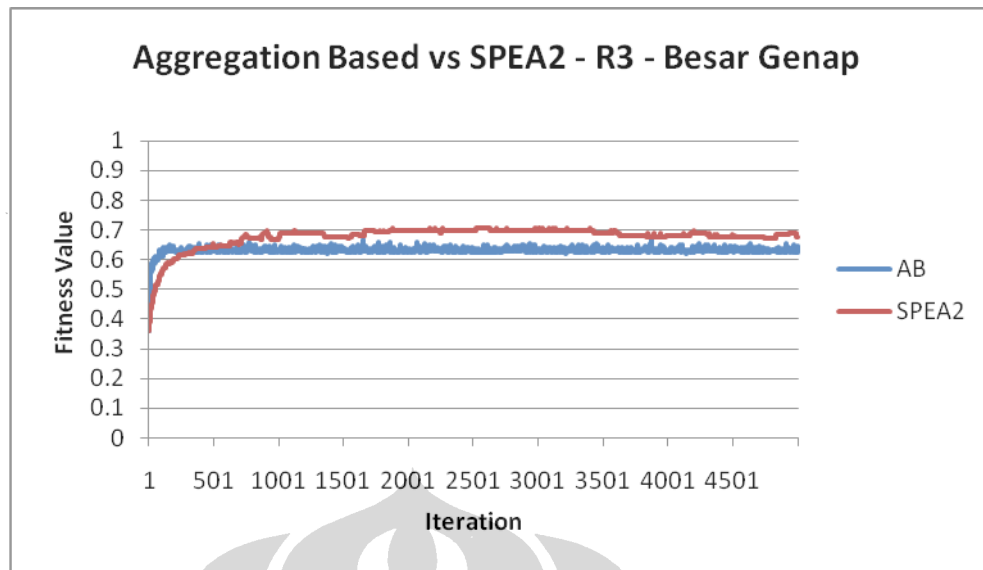


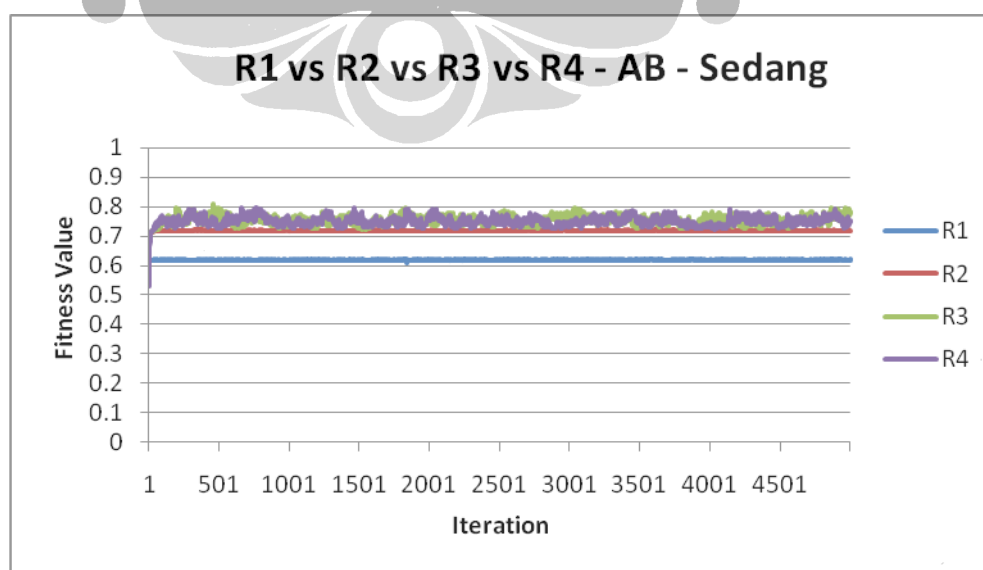
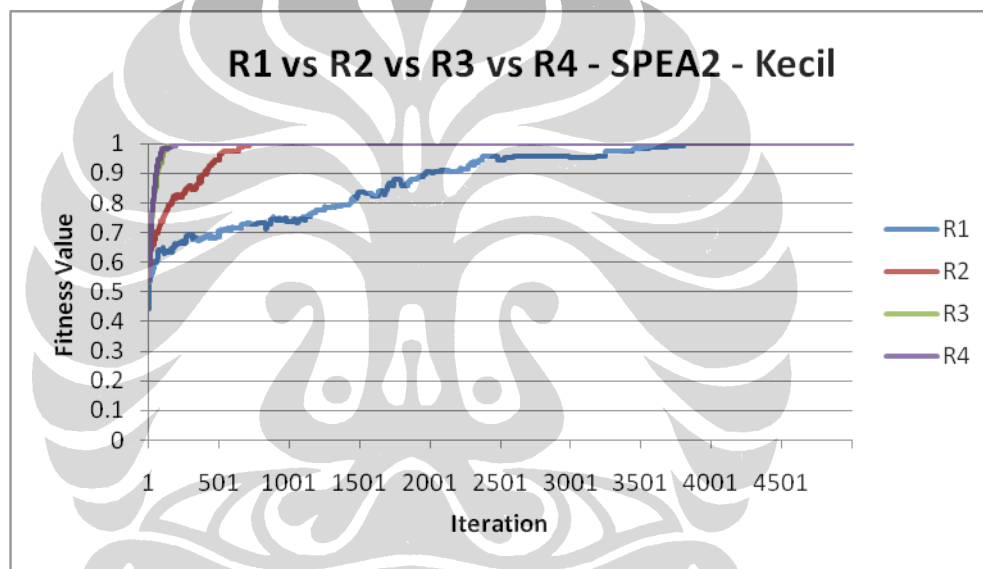
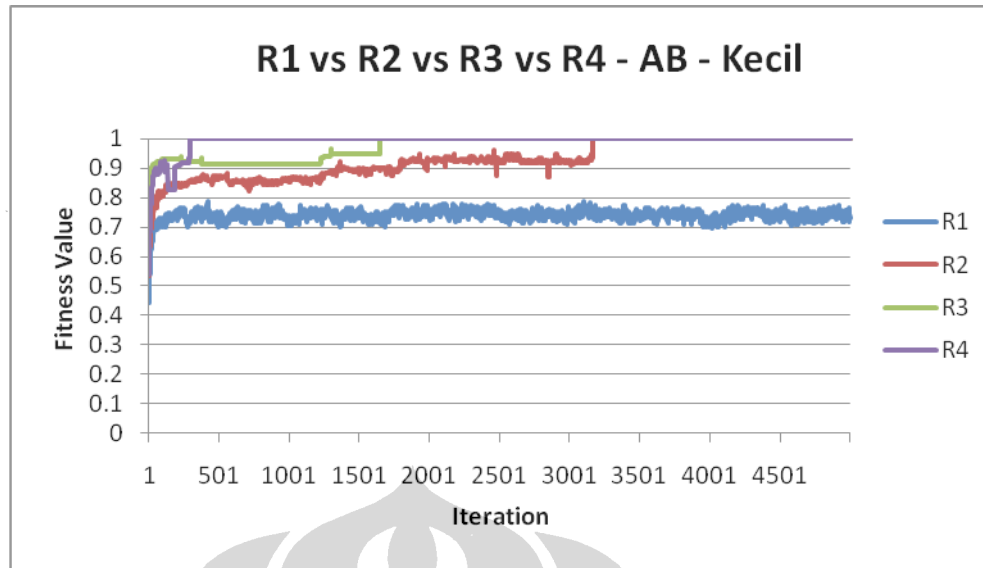


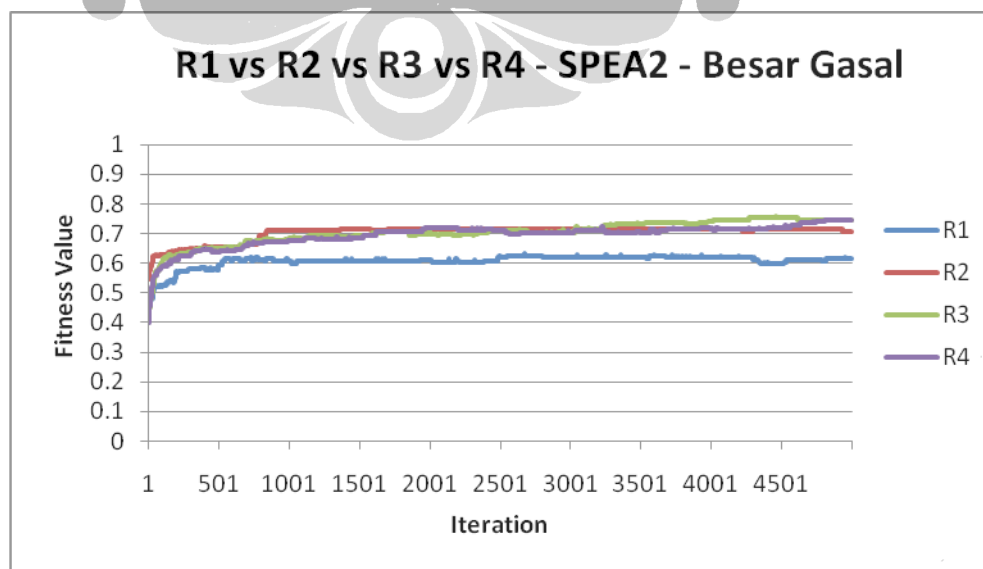
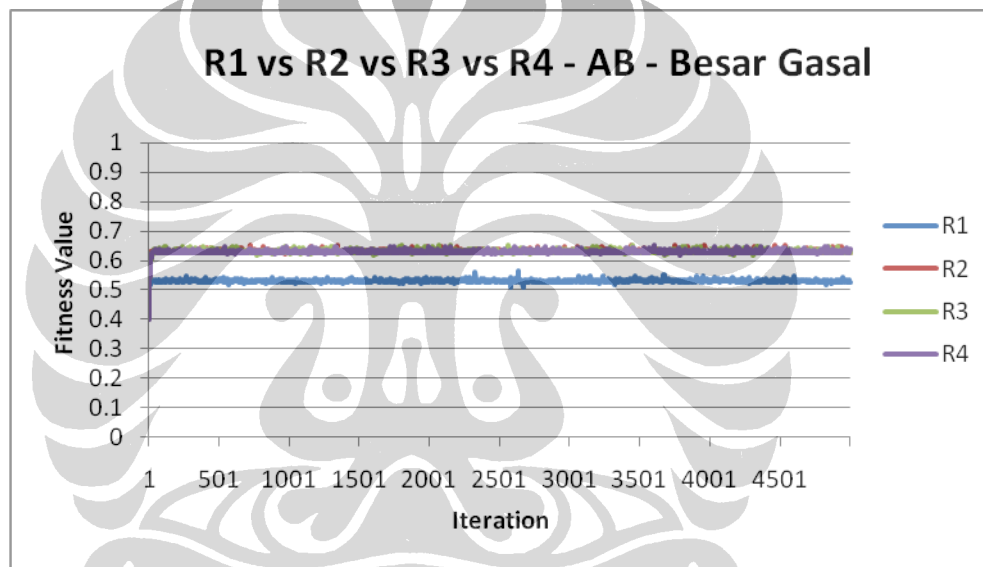
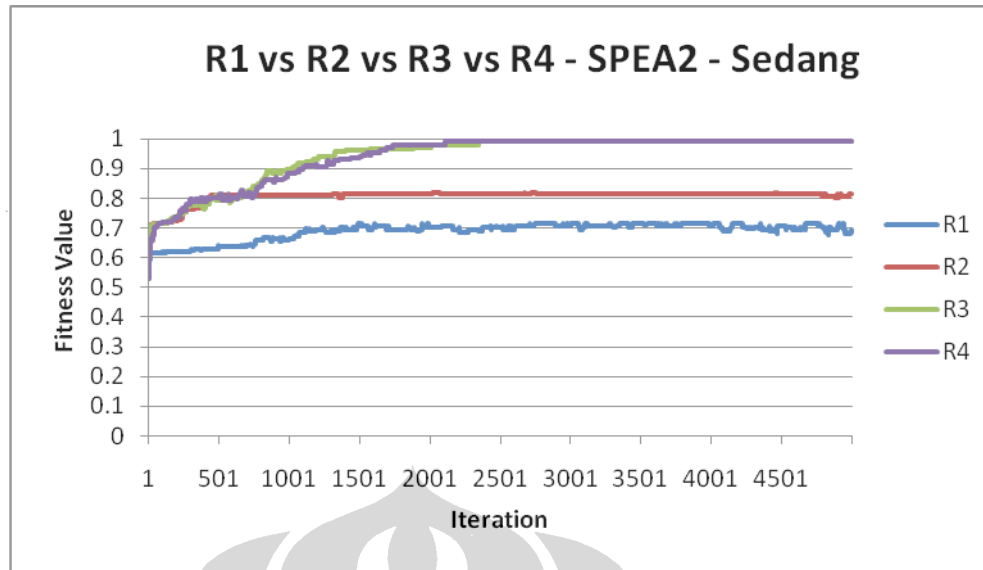


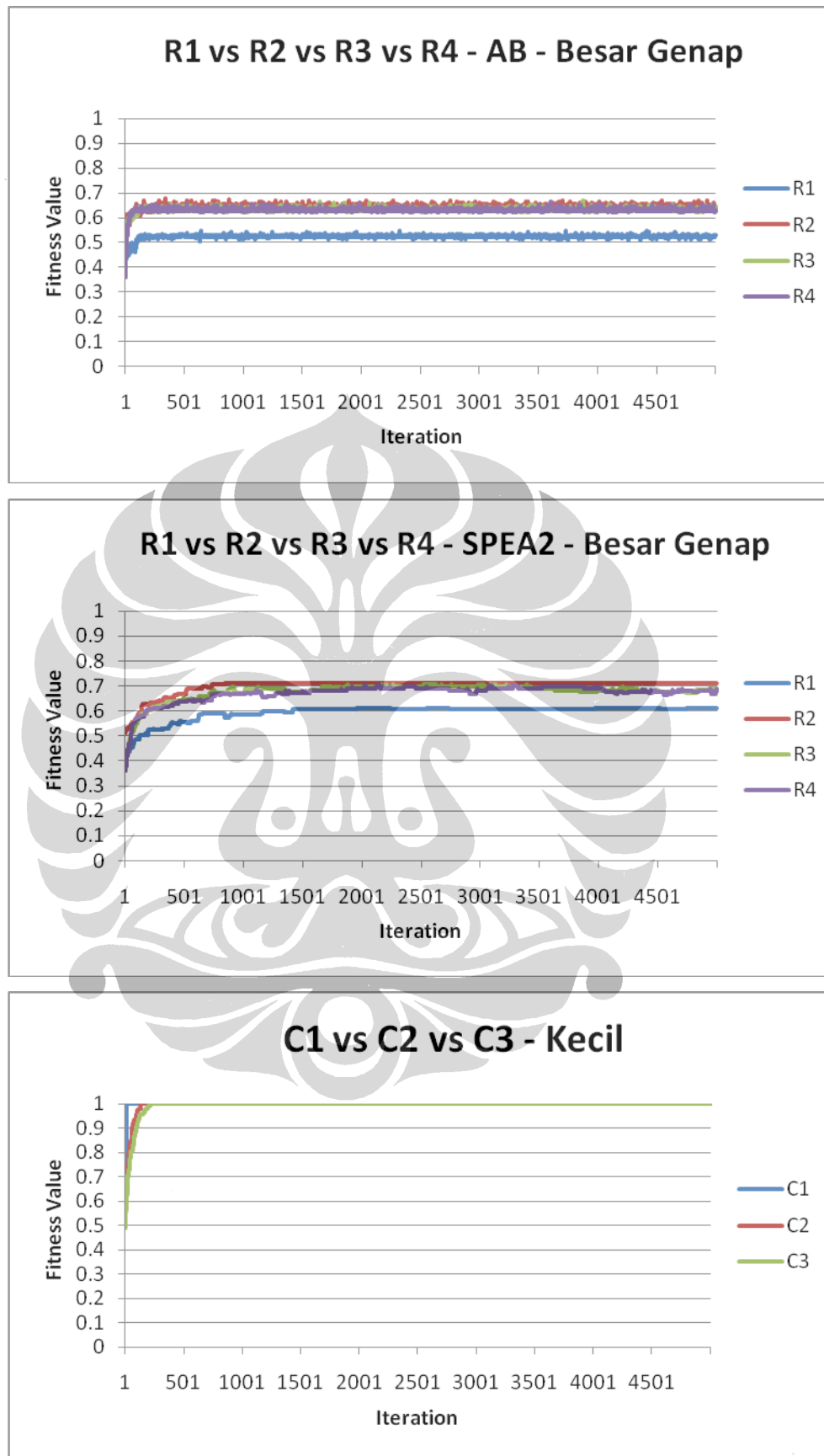


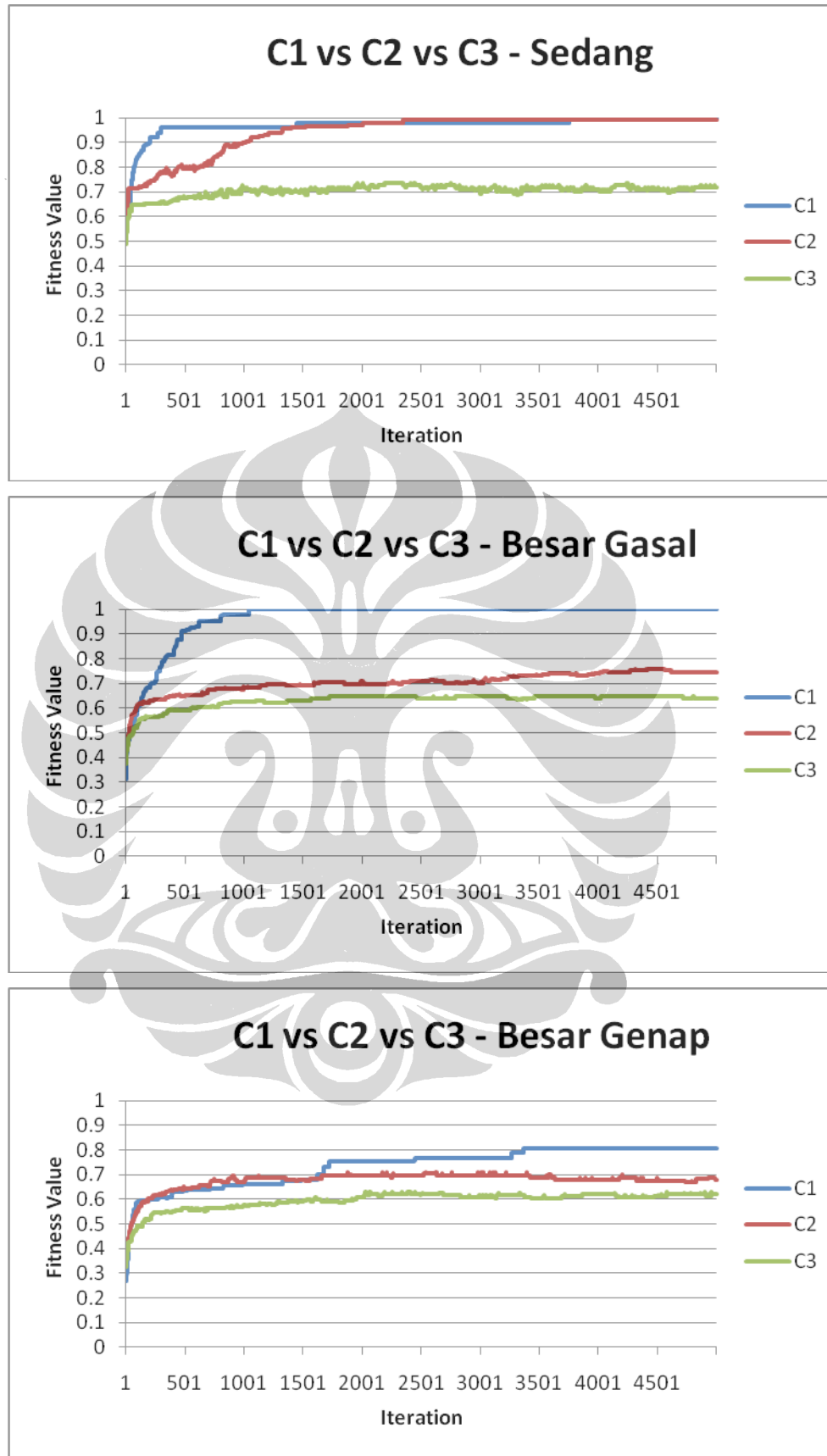


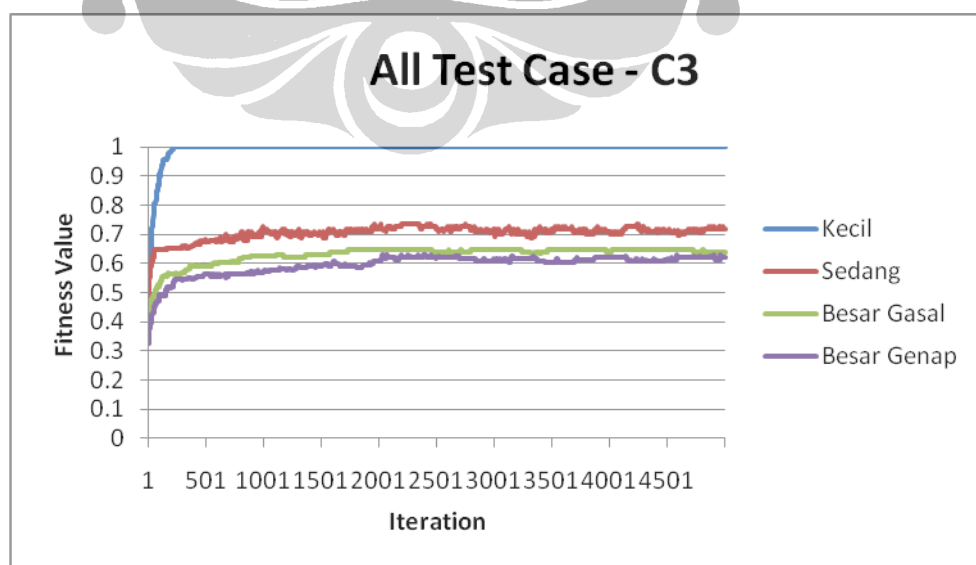
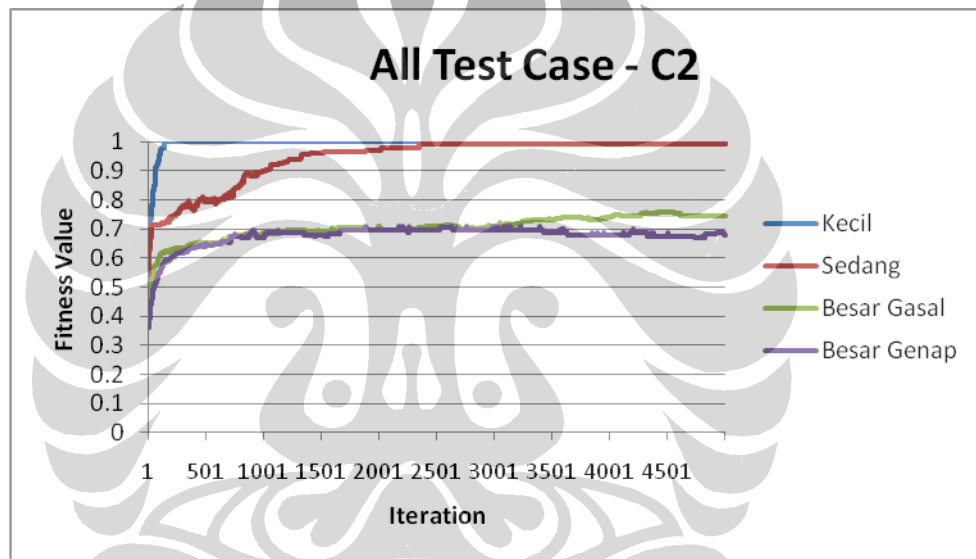
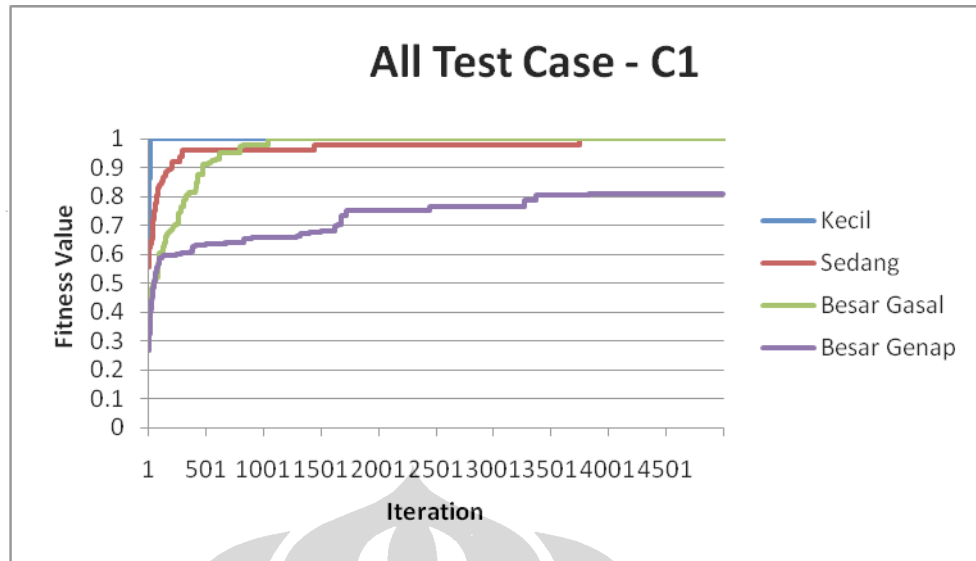


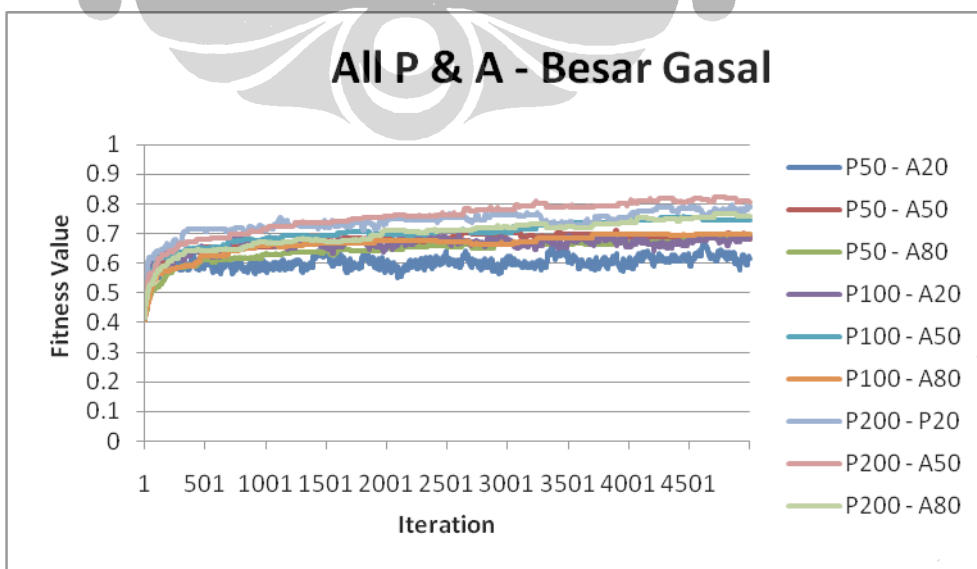
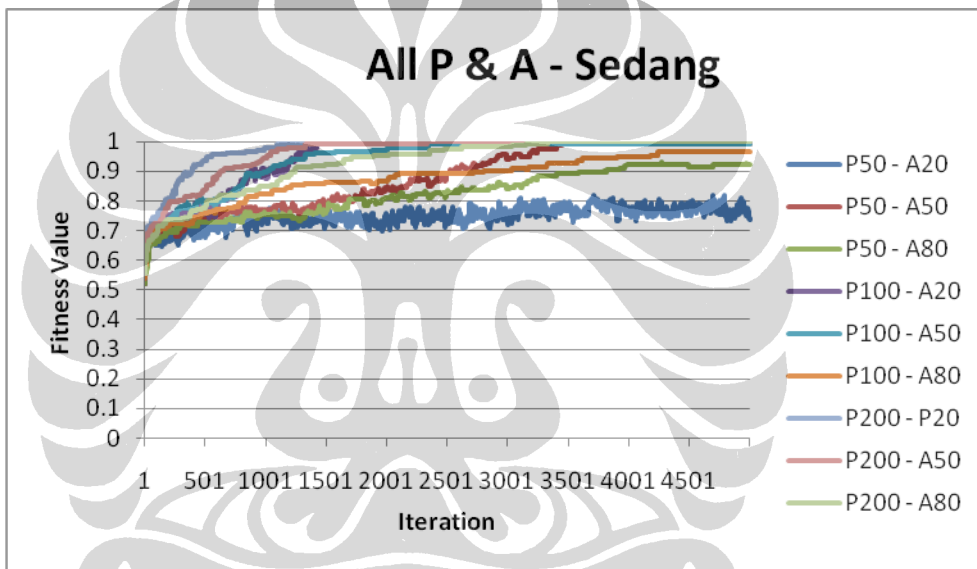
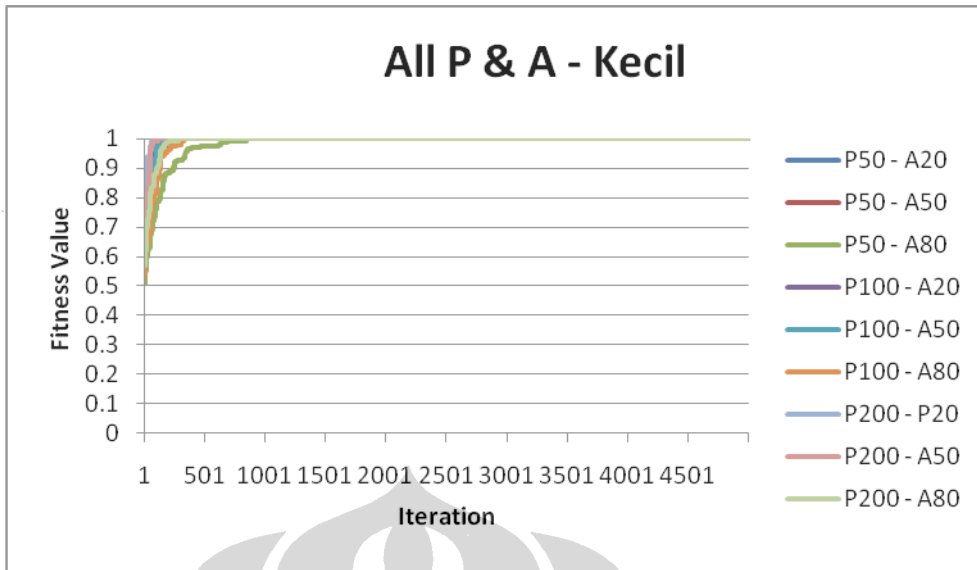


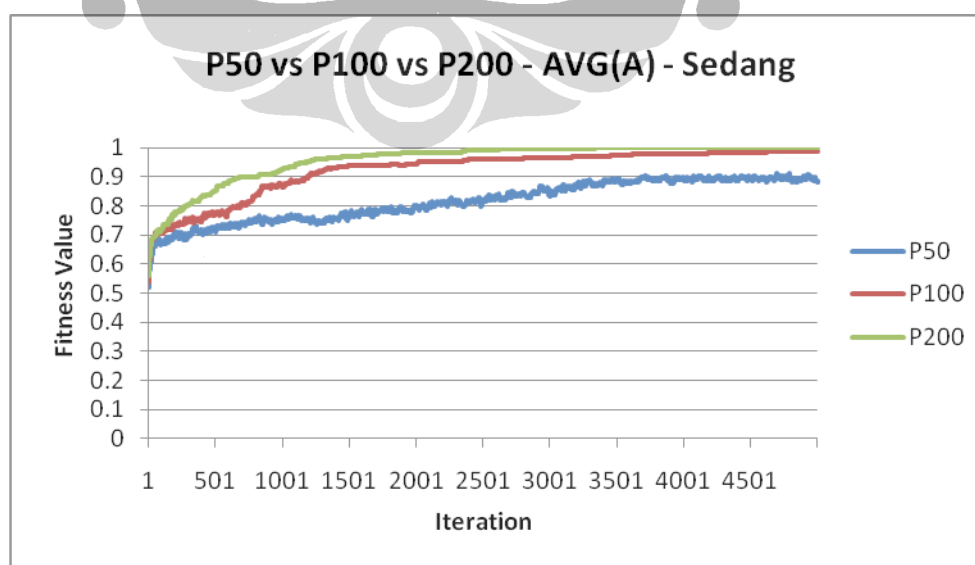
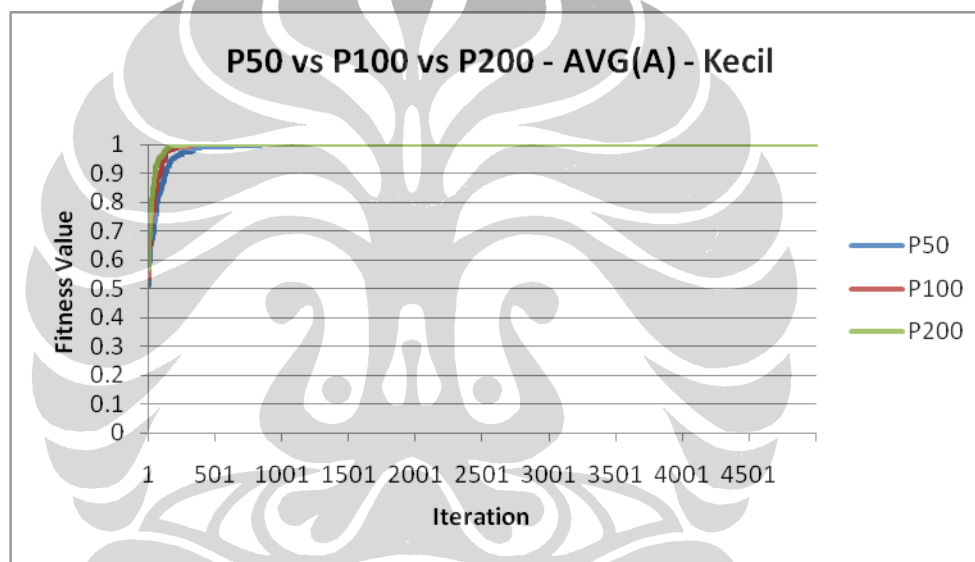
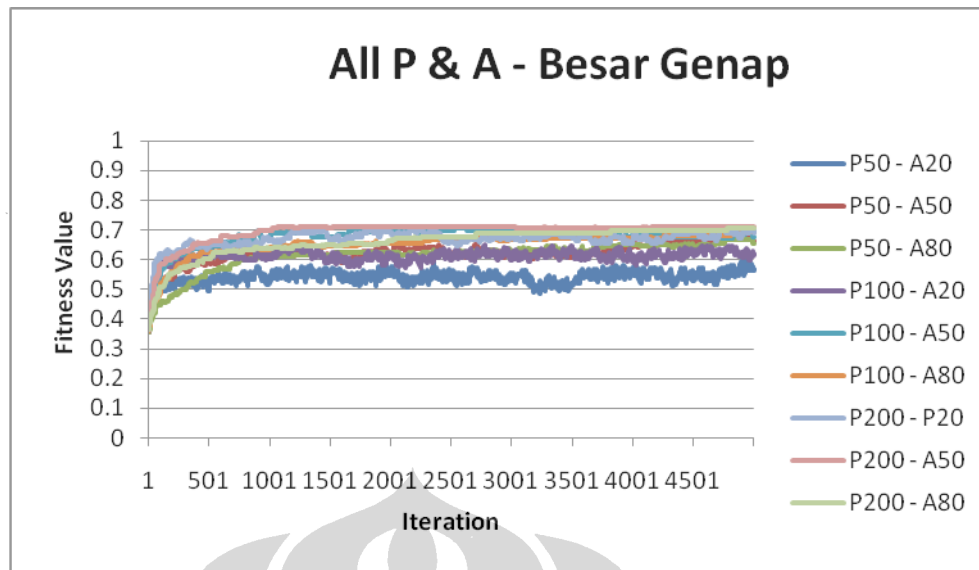


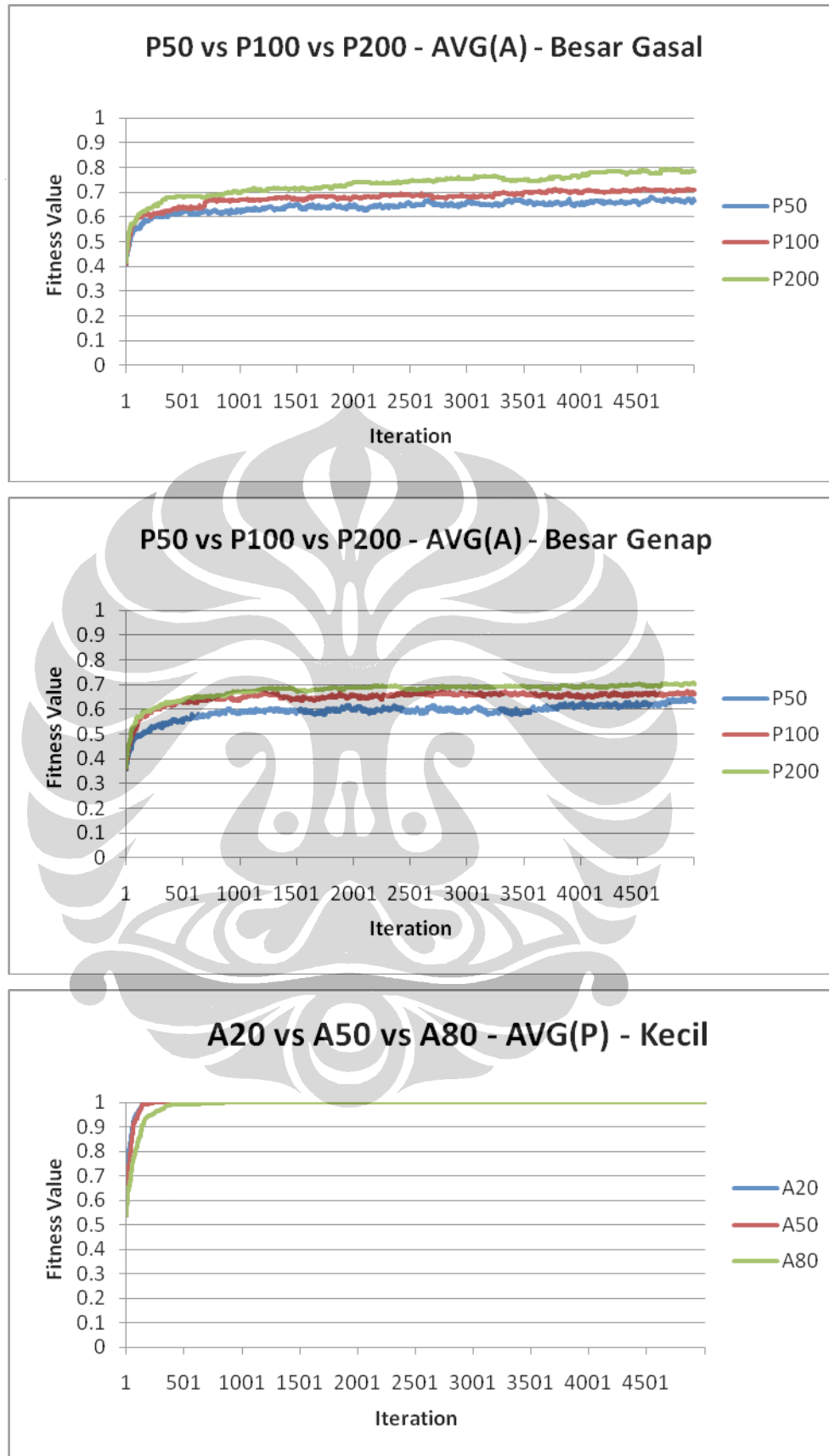


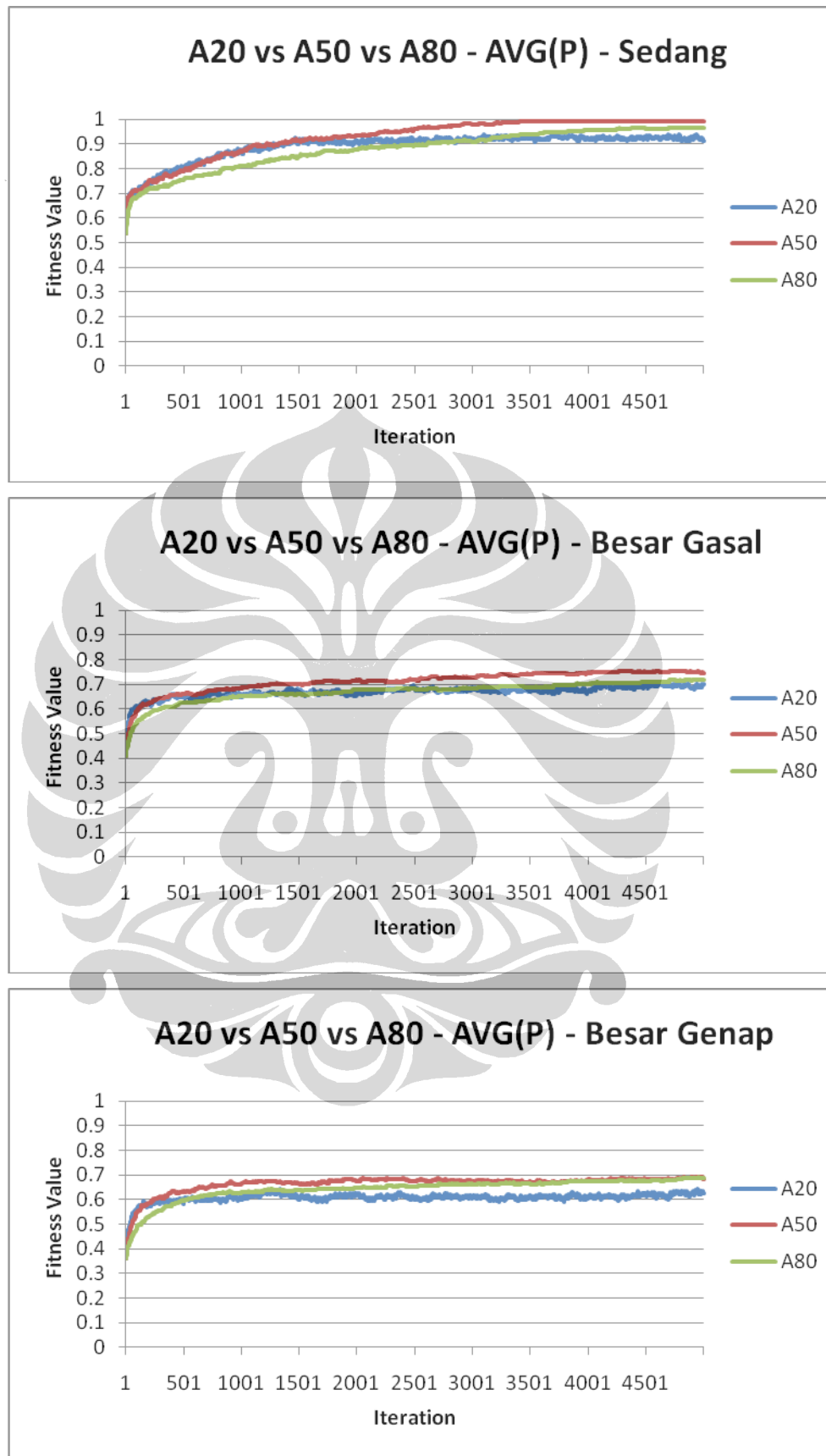


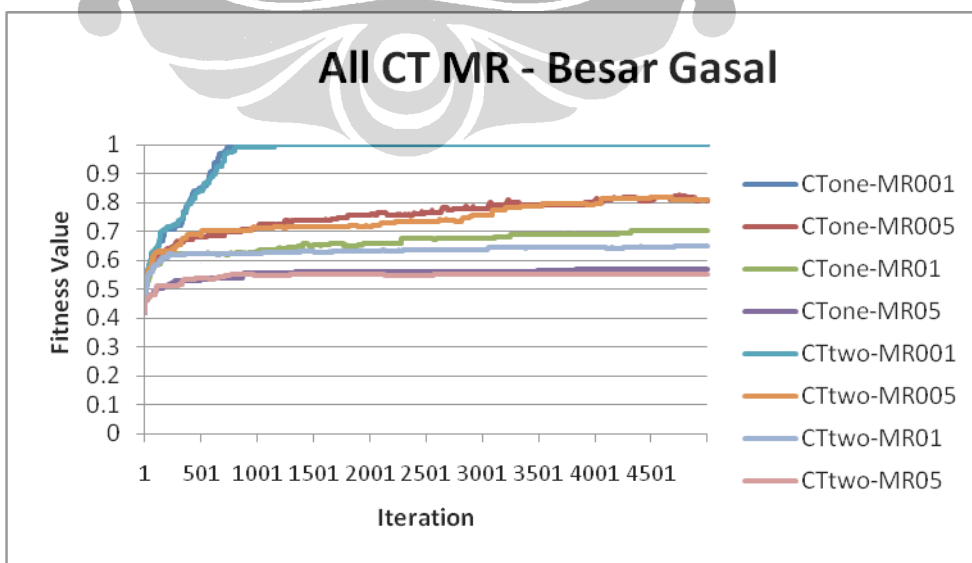
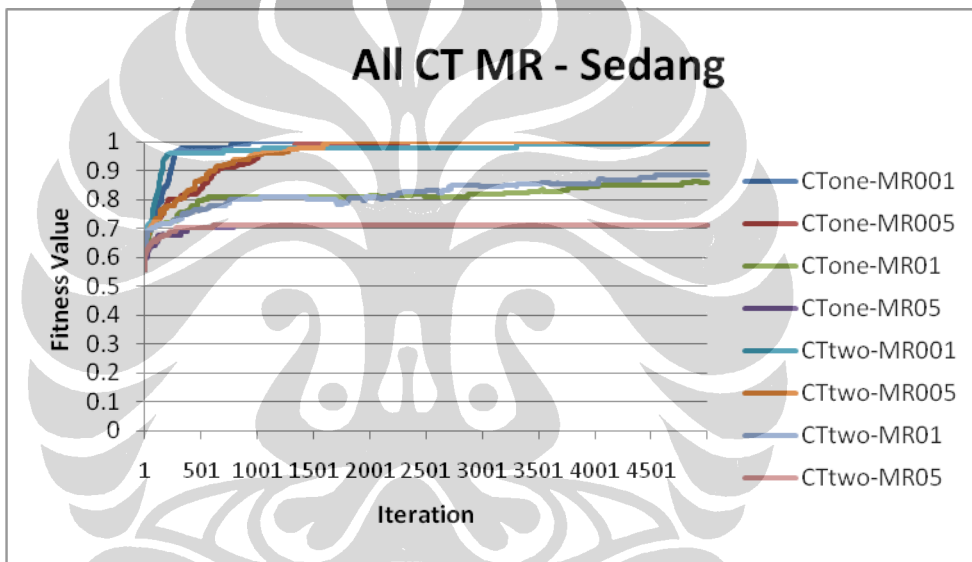
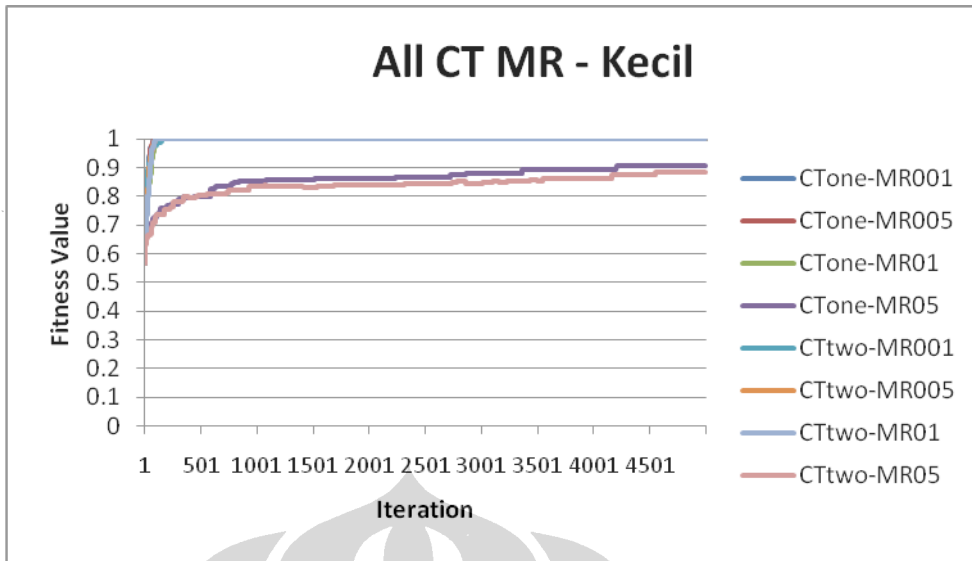


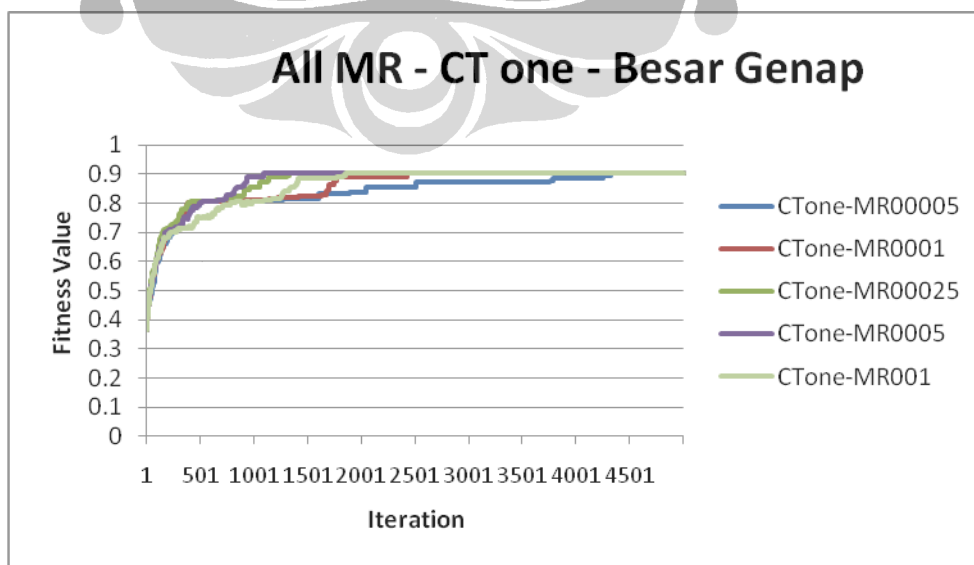
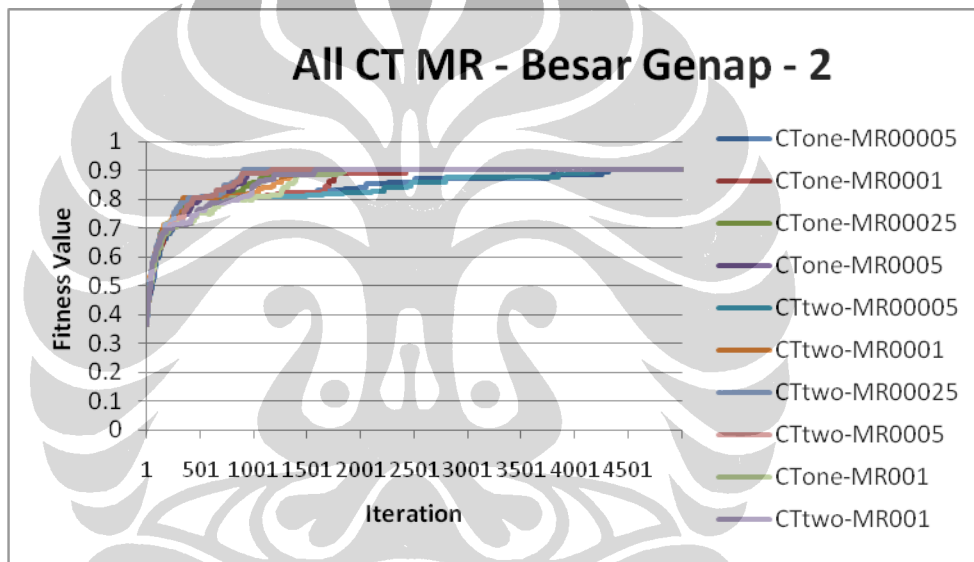
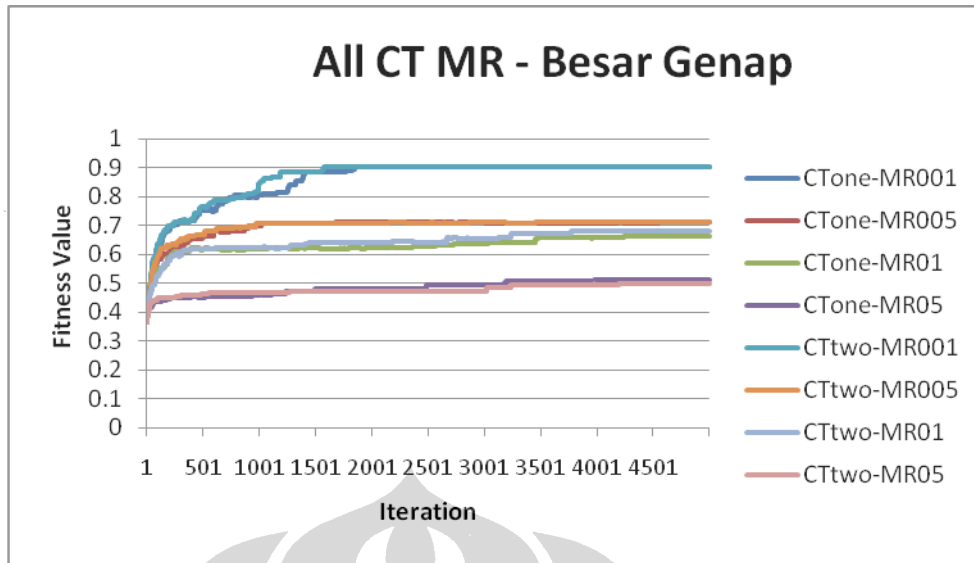


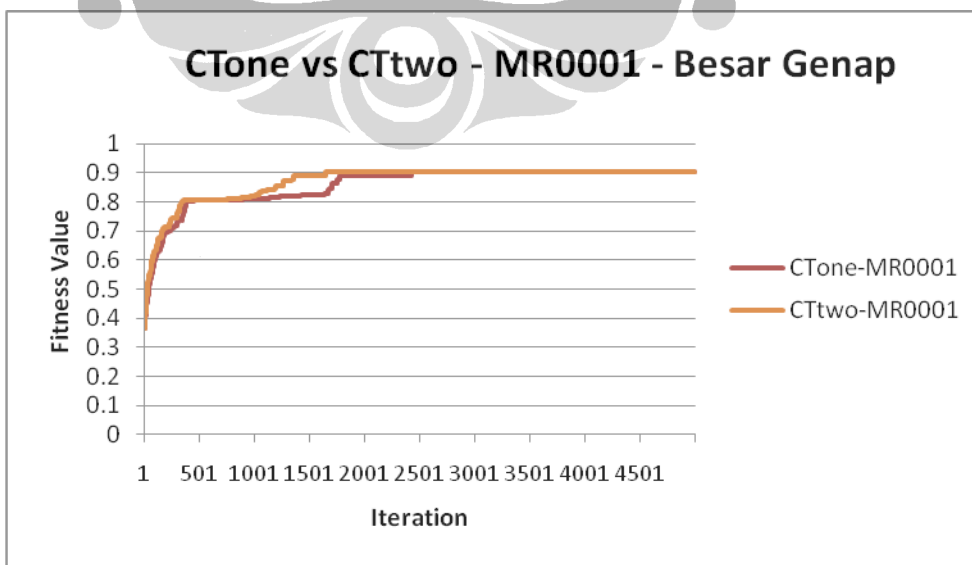
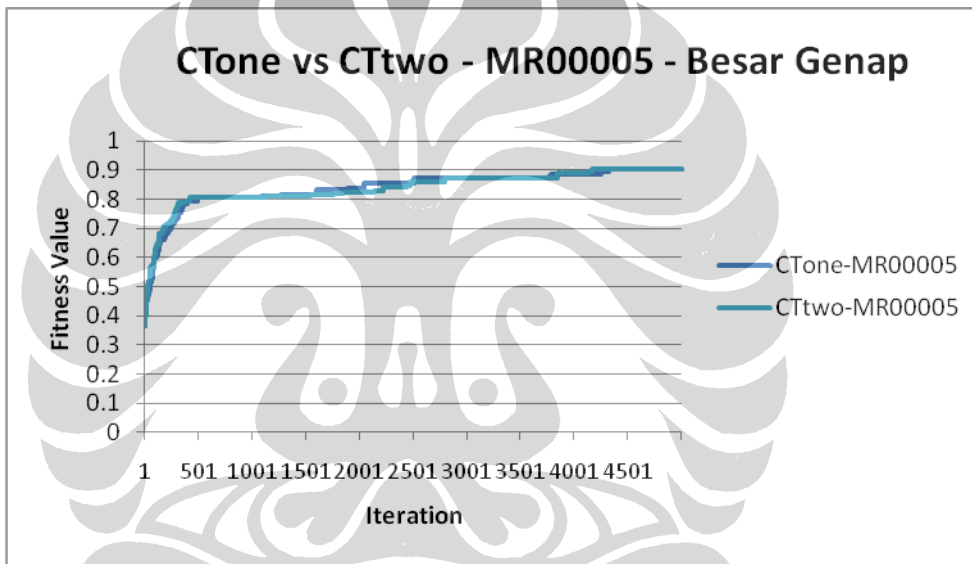
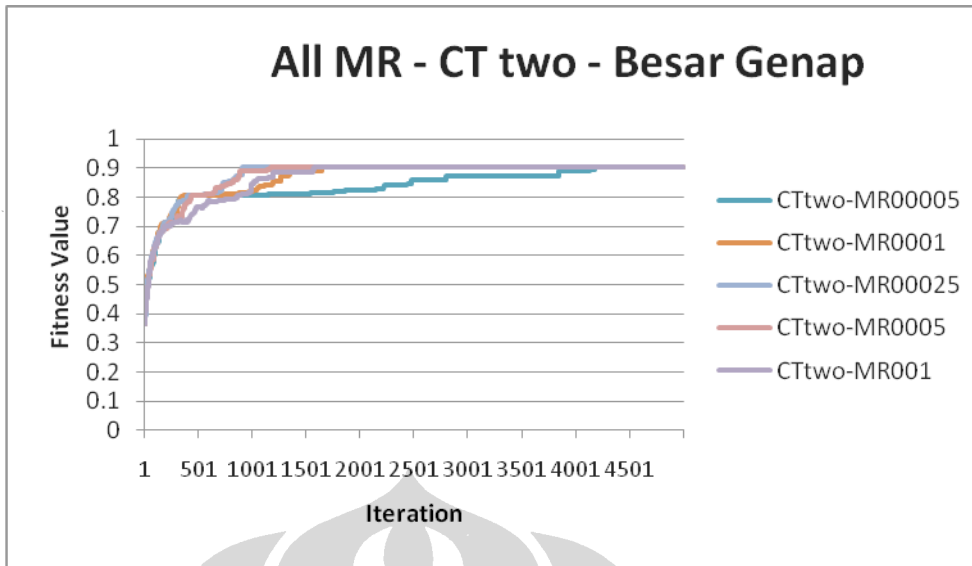


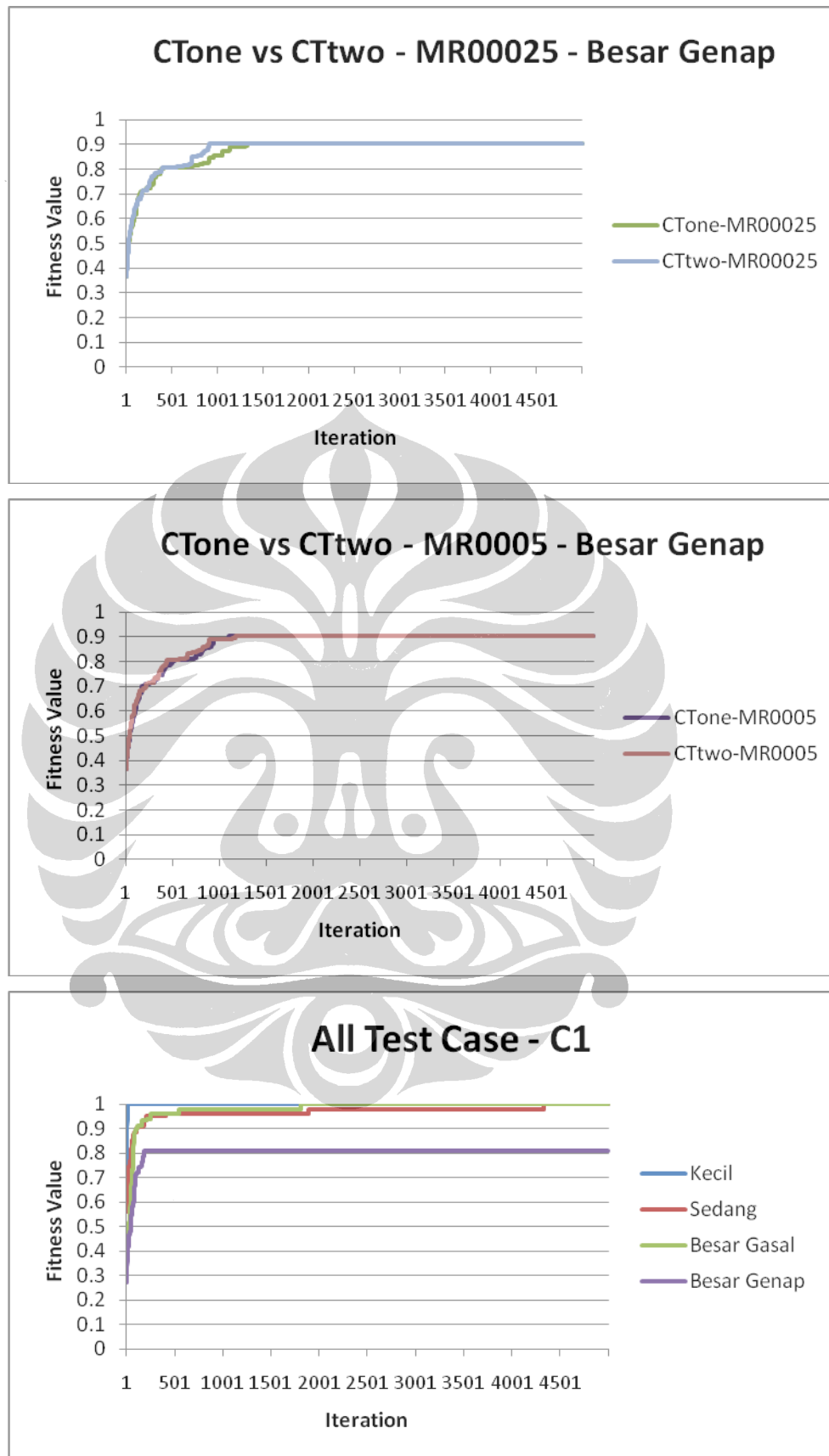


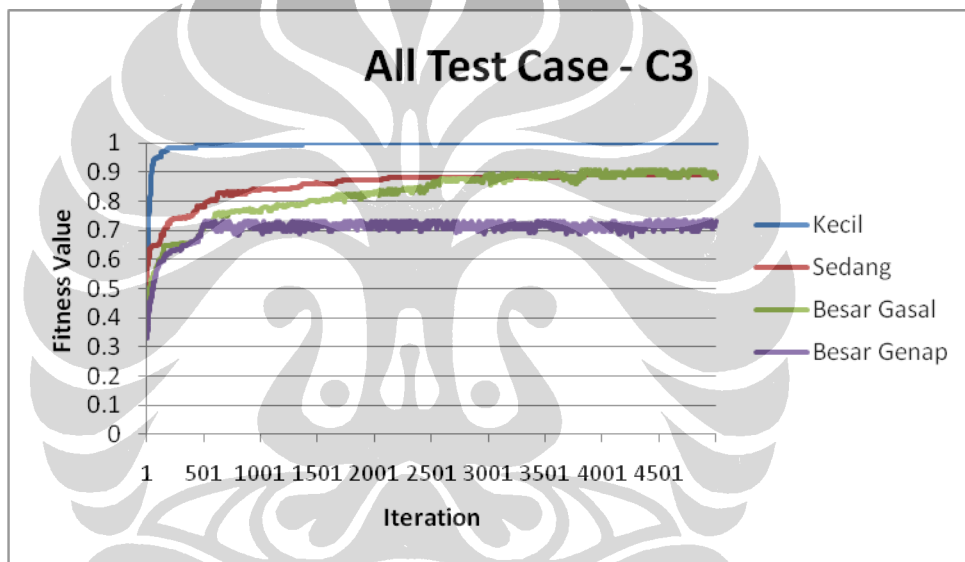
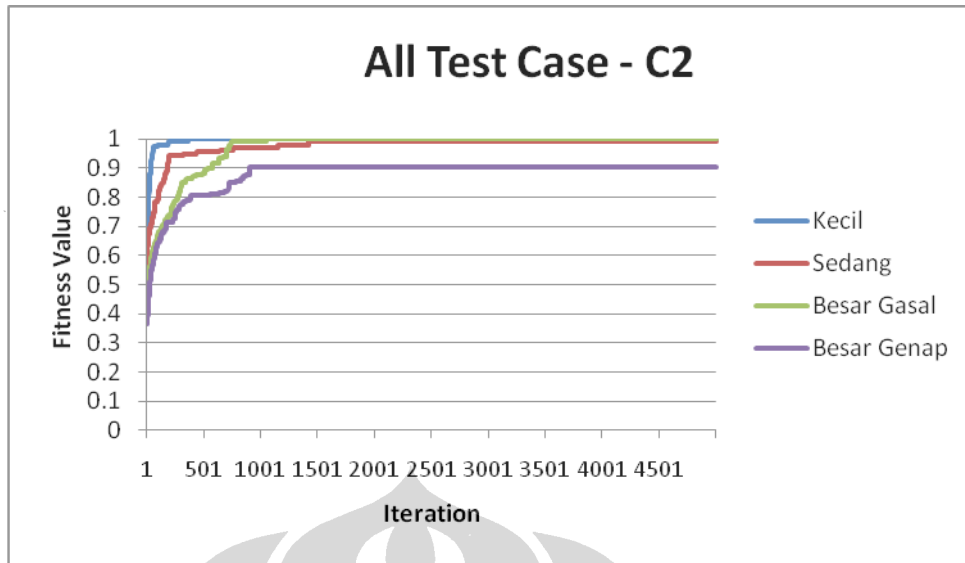












Lampiran B: Contoh Parameter File

```

#SPEA2 Parameter

#Number of threads and random number generator seeds
breedthreads    = 1
evalthreads     = 1
seed.0          = 7140

#Checkpointing
checkpoint       = false
checkpoint-modulo = 1000
prefix          = SPEA2

#Outputting Stuff
verbosity       = 0
flush          = true
nostore        = true

#The EvolutionState Object
state = ec.simple.SimpleEvolutionState

#Evolution Parameters
generations     = 1000
quit-on-run-complete = false

#The Initializer, Breeder, Exchanger, and Finisher
init    = ec.simple.SimpleInitializer
finish  = ec.simple.SimpleFinisher
breed   = ec.multiobjective.spea2.SPEA2Breeder
exch    = ec.simple.SimpleExchanger
exch.subpop.0.select = ec.select.TournamentSelection

#The Evaluator and the Problem
eval    = ec.multiobjective.spea2.SPEA2Evaluator
eval.problem = penjadwalanSPEA2R3.PenjadwalanSPEA2R3

#The Statistics
stat    = ec.simple.SimpleStatistics
stat.file    = $SPEA2kecilR3.stat
stat.gather-full = true
stat.num-children    = 1
stat.child.0        = penjadwalanSPEA2R3.MyStatistics
stat.child.0.pop-file    = popSPEA2kecilR3.stat
stat.child.0.info-file   = infoSPEA2kecilR3.stat

#Default Tournament Selection tournament size
select.tournament.size = 2

#The Population, and its one subpopulation, species, breeding
pipelines and individuals
pop    = ec.Population
pop.subpops    = 1
pop.subpop.0    = ec.multiobjective.spea2.SPEA2Subpopulation
pop.subpop.0.archive-size = 50
pop.subpop.0.size    = 100
pop.subpop.0.duplicate-retries = 0

```

```

pop.subpop.0.species          = ec.vector.IntegerVectorSpecies
pop.subpop.0.species.fitness  =
ec.multiobjective.spea2.SPEA2MultiObjectiveFitness
pop.subpop.0.species.fitness.numobjectives = 10

pop.subpop.0.species.ind      = ec.vector.IntegerVectorIndividual
pop.subpop.0.species.genome-size = 30
pop.subpop.0.species.crossover-type = one
pop.subpop.0.species.crossover-prob = 1.0
pop.subpop.0.species.mutation-prob = 0.05

pop.subpop.0.species.pipe     =
ec.vector.breed.VectorMutationPipeline
pop.subpop.0.species.pipe.source.0 =
ec.vector.breed.VectorCrossoverPipeline
pop.subpop.0.species.pipe.source.0.source.0 =
ec.multiobjective.spea2.SPEA2TournamentSelection
pop.subpop.0.species.pipe.source.0.source.1 = same

pop.subpop.0.species.min-gene = 0
pop.subpop.0.species.max-gene = 1
pop.subpop.0.species.min-gene.0 = 0
pop.subpop.0.species.max-gene.0 = 3
pop.subpop.0.species.min-gene.1 = 0
pop.subpop.0.species.max-gene.1 = 2
pop.subpop.0.species.min-gene.2 = 0
pop.subpop.0.species.max-gene.2 = 15
pop.subpop.0.species.min-gene.3 = 0
pop.subpop.0.species.max-gene.3 = 2
pop.subpop.0.species.min-gene.4 = 0
pop.subpop.0.species.max-gene.4 = 15
pop.subpop.0.species.min-gene.5 = 0
pop.subpop.0.species.max-gene.5 = 1
pop.subpop.0.species.min-gene.6 = 0
pop.subpop.0.species.max-gene.6 = 3
pop.subpop.0.species.min-gene.7 = 0
pop.subpop.0.species.max-gene.7 = 2
pop.subpop.0.species.min-gene.8 = 0
pop.subpop.0.species.max-gene.8 = 15
pop.subpop.0.species.min-gene.9 = 0
pop.subpop.0.species.max-gene.9 = 2
pop.subpop.0.species.min-gene.10 = 0
pop.subpop.0.species.max-gene.10 = 15
pop.subpop.0.species.min-gene.11 = 0
pop.subpop.0.species.max-gene.11 = 1
pop.subpop.0.species.min-gene.12 = 0
pop.subpop.0.species.max-gene.12 = 3
pop.subpop.0.species.min-gene.13 = 0
pop.subpop.0.species.max-gene.13 = 2
pop.subpop.0.species.min-gene.14 = 0
pop.subpop.0.species.max-gene.14 = 15
pop.subpop.0.species.min-gene.15 = 0
pop.subpop.0.species.max-gene.15 = 2
pop.subpop.0.species.min-gene.16 = 0
pop.subpop.0.species.max-gene.16 = 15
pop.subpop.0.species.min-gene.17 = 0
pop.subpop.0.species.max-gene.17 = 1
pop.subpop.0.species.min-gene.18 = 0

```

```
pop.subpop.0.species.max-gene.18 = 3
pop.subpop.0.species.min-gene.19 = 0
pop.subpop.0.species.max-gene.19 = 2
pop.subpop.0.species.min-gene.20 = 0
pop.subpop.0.species.max-gene.20 = 15
pop.subpop.0.species.min-gene.21 = 0
pop.subpop.0.species.max-gene.21 = 2
pop.subpop.0.species.min-gene.22 = 0
pop.subpop.0.species.max-gene.22 = 15
pop.subpop.0.species.min-gene.23 = 0
pop.subpop.0.species.max-gene.23 = 1
pop.subpop.0.species.min-gene.24 = 0
pop.subpop.0.species.max-gene.24 = 3
pop.subpop.0.species.min-gene.25 = 0
pop.subpop.0.species.max-gene.25 = 2
pop.subpop.0.species.min-gene.26 = 0
pop.subpop.0.species.max-gene.26 = 15
pop.subpop.0.species.min-gene.27 = 0
pop.subpop.0.species.max-gene.27 = 2
pop.subpop.0.species.min-gene.28 = 0
pop.subpop.0.species.max-gene.28 = 15
pop.subpop.0.species.min-gene.29 = 0
pop.subpop.0.species.max-gene.29 = 1
```



Lampiran C: Contoh Output File

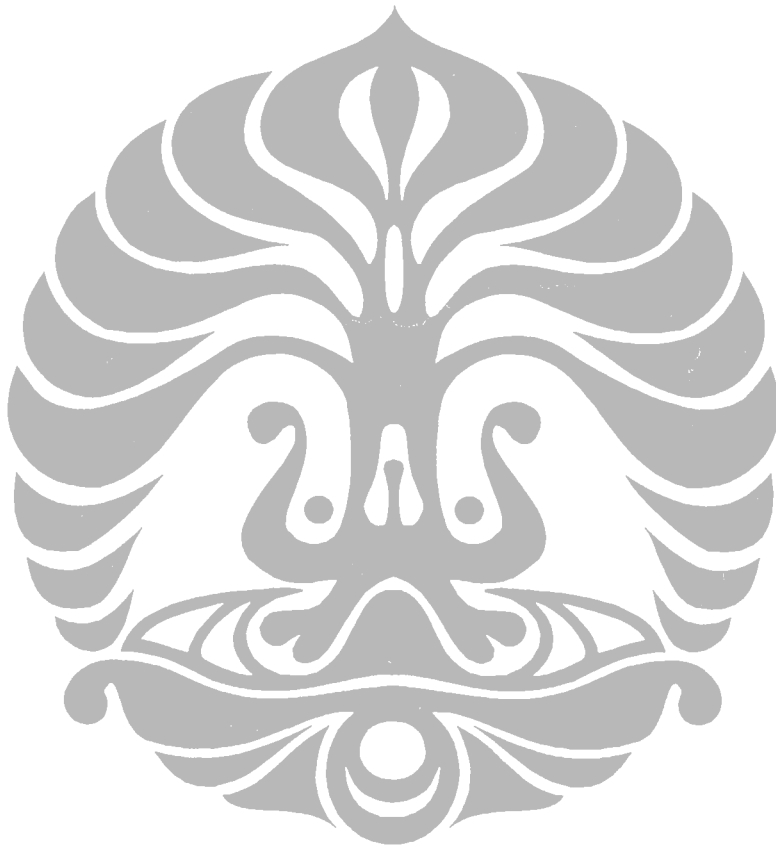
```

-----
Konfigurasi Akhir:
-----
Mata Kuliah                               Dosen   Ruang   Slot
IKI10820 Dasar-Dasar Pemrograman B       Kivin  R 2102 Selasa(14.00-
15.00)
IKI20200 Organisasi Sistem Komputer       Kivin  R 2302 Senin(09.00-
10.00)
IKI10820 Dasar-Dasar Pemrograman A       Yuba   R 2102 Senin(08.00-
09.00)
IKI10820 Dasar-Dasar Pemrograman A       Yuba   R 2102 Senin(11.00-
12.00)
IKI10201 Pengantar Sistem Digital         Rus    R 2102 Selasa(13.00-
14.00)
IKI10201 Pengantar Sistem Digital         Rus    R 2102 Senin(09.00-
10.00)
IKI20200 Organisasi Sistem Komputer       Kivin  R 2301 Selasa(09.00-
10.00)
IKI20100 Struktur Data & Algoritma       Halsen R 2102 Selasa(08.00-
09.00)
IKI10201 Pengantar Sistem Digital         Yuba   R 2102 Senin(16.00-
17.00)
IKI10820 Dasar-Dasar Pemrograman B       Yuba   R 2102 Senin(10.00-
11.00)
IKI20100 Struktur Data & Algoritma       Kivin  R 2102 Selasa(15.00-
16.00)
IKI10820 Dasar-Dasar Pemrograman B       Rus    R 2302 Selasa(15.00-
16.00)
IKI20200 Organisasi Sistem Komputer       Yuba   R 2102 Selasa(14.00-
15.00)
IKI20100 Struktur Data & Algoritma       Yuba   R 2102 Senin(14.00-
15.00)
IKI10820 Dasar-Dasar Pemrograman A       Halsen R 2301 Selasa(10.00-
11.00)
IKI10201 Pengantar Sistem Digital         Yuba   R 2102 Senin(13.00-
14.00)
IKI10820 Dasar-Dasar Pemrograman B       Halsen R 2302 Senin(14.00-
15.00)
IKI20100 Struktur Data & Algoritma       Rus    R 2102 Selasa(10.00-
11.00)
IKI10820 Dasar-Dasar Pemrograman A       Yuba   R 2302 Selasa(11.00-
12.00)
-----
Laporan Pelanggaran Constraint:
-----
Pelanggaran hc1 - jadwal semua mata kuliah sesuai dengan total
sks-nya:
Pelanggaran hc2 - mk wajib di tingkat yang sama tidak boleh
bentrok:
Pelanggaran hc3 - ruang dan waktu yang sama tidak boleh diisi 2
mata kuliah yang berbeda || ruangan dan slot spesifik hanya diisi
1 mk:
Ruang & Slot R0S13 dipakai lebih dari 1 mk

```

Pelanggaran hc4 - dosen tidak boleh mengajar lebih dari 1 mk pada saat(waktu) yang sama || dosen dan slot spesifik hanya diisi 1 mk:
 Pelanggaran hc5 - jumlah pengikut suatu mk <= kapasitas ruangan:
 Pelanggaran sc1 - dosen memiliki batasan maksimal mengajar sebanyak X sks:
 Yuba dengan maksimum 3 sks, mengajar sebanyak 8 sks
 Pelanggaran sc2 - dosen hanya mengajar kuliah yang dia expertise:
 Kivin mengajar mk yang bukan expertisanya, yaitu IKI10820 Dasar-Dasar Pemrograman B
 Kivin mengajar mk yang bukan expertisanya, yaitu IKI20200 Organisasi Sistem Komputer
 Yuba mengajar mk yang bukan expertisanya, yaitu IKI10820 Dasar-Dasar Pemrograman A
 Yuba mengajar mk yang bukan expertisanya, yaitu IKI10820 Dasar-Dasar Pemrograman A
 Rus mengajar mk yang bukan expertisanya, yaitu IKI10201 Pengantar Sistem Digital
 Rus mengajar mk yang bukan expertisanya, yaitu IKI10201 Pengantar Sistem Digital
 Kivin mengajar mk yang bukan expertisanya, yaitu IKI20200 Organisasi Sistem Komputer
 Halsen mengajar mk yang bukan expertisanya, yaitu IKI20100 Struktur Data & Algoritma
 Yuba mengajar mk yang bukan expertisanya, yaitu IKI10201 Pengantar Sistem Digital
 Yuba mengajar mk yang bukan expertisanya, yaitu IKI10820 Dasar-Dasar Pemrograman B
 Kivin mengajar mk yang bukan expertisanya, yaitu IKI20100 Struktur Data & Algoritma
 Rus mengajar mk yang bukan expertisanya, yaitu IKI10820 Dasar-Dasar Pemrograman B
 Yuba mengajar mk yang bukan expertisanya, yaitu IKI20100 Struktur Data & Algoritma
 Yuba mengajar mk yang bukan expertisanya, yaitu IKI10201 Pengantar Sistem Digital
 Yuba mengajar mk yang bukan expertisanya, yaitu IKI10820 Dasar-Dasar Pemrograman A
 Pelanggaran sc3 - dosen hanya mengajar kuliah di waktu lowong:
 Kivin mengajar tidak di waktu lowongnya, yaitu Senin(09.00-10.00)
 Yuba mengajar tidak di waktu lowongnya, yaitu Senin(08.00-09.00)
 Yuba mengajar tidak di waktu lowongnya, yaitu Senin(11.00-12.00)
 Rus mengajar tidak di waktu lowongnya, yaitu Selasa(13.00-14.00)
 Kivin mengajar tidak di waktu lowongnya, yaitu Selasa(09.00-10.00)
 Yuba mengajar tidak di waktu lowongnya, yaitu Senin(16.00-17.00)
 Yuba mengajar tidak di waktu lowongnya, yaitu Senin(10.00-11.00)
 Kivin mengajar tidak di waktu lowongnya, yaitu Selasa(15.00-16.00)
 Rus mengajar tidak di waktu lowongnya, yaitu Selasa(15.00-16.00)
 Yuba mengajar tidak di waktu lowongnya, yaitu Selasa(14.00-15.00)
 Halsen mengajar tidak di waktu lowongnya, yaitu Senin(14.00-15.00)
 Rus mengajar tidak di waktu lowongnya, yaitu Selasa(10.00-11.00)
 Yuba mengajar tidak di waktu lowongnya, yaitu Selasa(11.00-12.00)
 Pelanggaran sc4 - kuliah tidak terpotong makan siang:

Pelanggaran sc5 - kuliah tidak terpotong ke hari berikutnya:



Lampiran D: Contoh Batch File

```

java -classpath bin ec.Evolve -file
bin/penjadwalanSPEA2R3/SPEA2kecilR3.params -p checkpoint=false -p
generations=5000 -p seed.0=7140 -p
stat.file=$penjadwalanSPEA2kecilR3-C1-7140.stat -p
stat.child.0.info-file=infoSPEA2kecilR3-C1-7140.stat -p
stat.child.0.pop-file=popSPEA2kecilR3-C1-7140.stat -p
select.tournament.size=8 -p pop.subpop.0.size=200 -p
pop.subpop.0.archive-size=100 -p pop.subpop.0.species.crossover-
type=two -p pop.subpop.0.species.crossover-prob=1.0 -p
pop.subpop.0.species.mutation-prob=0.0025 -p
pop.subpop.0.species.fitness.numobjectives=5

java -classpath bin ec.Evolve -file
bin/penjadwalanSPEA2R3/SPEA2kecilR3.params -p checkpoint=false -p
generations=5000 -p seed.0=6860 -p
stat.file=$penjadwalanSPEA2kecilR3-C1-6860.stat -p
stat.child.0.info-file=infoSPEA2kecilR3-C1-6860.stat -p
stat.child.0.pop-file=popSPEA2kecilR3-C1-6860.stat -p
select.tournament.size=8 -p pop.subpop.0.size=200 -p
pop.subpop.0.archive-size=100 -p pop.subpop.0.species.crossover-
type=two -p pop.subpop.0.species.crossover-prob=1.0 -p
pop.subpop.0.species.mutation-prob=0.0025 -p
pop.subpop.0.species.fitness.numobjectives=5

java -classpath bin ec.Evolve -file
bin/penjadwalanSPEA2R3/SPEA2kecilR3.params -p checkpoint=false -p
generations=5000 -p seed.0=9948 -p
stat.file=$penjadwalanSPEA2kecilR3-C1-9948.stat -p
stat.child.0.info-file=infoSPEA2kecilR3-C1-9948.stat -p
stat.child.0.pop-file=popSPEA2kecilR3-C1-9948.stat -p
select.tournament.size=8 -p pop.subpop.0.size=200 -p
pop.subpop.0.archive-size=100 -p pop.subpop.0.species.crossover-
type=two -p pop.subpop.0.species.crossover-prob=1.0 -p
pop.subpop.0.species.mutation-prob=0.0025 -p
pop.subpop.0.species.fitness.numobjectives=5

java -classpath bin ec.Evolve -file
bin/penjadwalanSPEA2R3/SPEA2kecilR3.params -p checkpoint=false -p
generations=5000 -p seed.0=5703 -p
stat.file=$penjadwalanSPEA2kecilR3-C1-5703.stat -p
stat.child.0.info-file=infoSPEA2kecilR3-C1-5703.stat -p
stat.child.0.pop-file=popSPEA2kecilR3-C1-5703.stat -p
select.tournament.size=8 -p pop.subpop.0.size=200 -p
pop.subpop.0.archive-size=100 -p pop.subpop.0.species.crossover-
type=two -p pop.subpop.0.species.crossover-prob=1.0 -p
pop.subpop.0.species.mutation-prob=0.0025 -p
pop.subpop.0.species.fitness.numobjectives=5

java -classpath bin ec.Evolve -file
bin/penjadwalanSPEA2R3/SPEA2kecilR3.params -p checkpoint=false -p
generations=5000 -p seed.0=9449 -p
stat.file=$penjadwalanSPEA2kecilR3-C1-9449.stat -p
stat.child.0.info-file=infoSPEA2kecilR3-C1-9449.stat -p
stat.child.0.pop-file=popSPEA2kecilR3-C1-9449.stat -p
select.tournament.size=8 -p pop.subpop.0.size=200 -p

```

```
pop.subpop.0.archive-size=100 -p pop.subpop.0.species.crossover-  
type=two -p pop.subpop.0.species.crossover-prob=1.0 -p  
pop.subpop.0.species.mutation-prob=0.0025 -p  
pop.subpop.0.species.fitness.numobjectives=5  
  
pause
```

