Table 1: The description of parameters.

Parameters	Description
bms	bms = 0 : do not perform bms strategy; bms = 1 : performs bms strategy.
bn	the parameter of bms strategy, configured when bms = 1.
bt	bt = 0 : breaking ties randomly; bt = 1 : breaking ties in favor of the largest age.
$cons$	$cons$ = 0 : randomized construction; $cons$ = 1 : weight-based construction; $cons$ = 2 : degree-based construction.
$drop$	$drop$ = 0 : weight-based selection of removed vertex; $drop$ = 1 : randomized selection with a probability, otherwise weight-based selection; $drop$ = 2 : randomized selection.
rd_prob	the probability of randomized selection of removed vertex, configured when $drop$ = 1.
p_rs	p_rs = $False$: do not perform restart local search; p_rs = $True$: perform restart local search.
res_prob	the probability of performing restart local search, configured when p_rs = 1.
p_rw	p_rw = $False$: do not perform random walk component; p_rw = $True$: perform random walk component.
rw_prob	the probability of performing random walk.
$tabu$	the prohibition strategy, $tabu$ = 0 : utilizes SCC strategy; $tabu$ = 1 : utilizes tabu strategy in MN/TS; $tabu$ = 2 : utilizes TabuCC strategy in this paper.
$tabul$	the tabu tenure, configured when $tabu$ = 1.
$tabul2$	the tabu tenure, configured when $tabu$ = 2.

Table 2: The configuration space of PbO-MWC.

Parameters	Depended Conditions	Parameter Type	Value Domain	Default Value
bms	-	Categorical	{0,1}	1
bn	bms = 1	Integer	[1,100]	50
bt	-	Categorical	{0,1}	0
$cons$	-	Categorical	{0,1,2}	0
$drop$	-	Categorical	{0,1,2}	0
rd_prob	$drop$ = 1	Categorical	{0.1,0.2,...,0.9}	0.2
p_rs	-	Boolean-valued	{$True$,$False$}	$False$
res_prob	p_rs = 1	Real	[0.0000001,0.0001]	0.000001
p_rw	-	Boolean-valued	{$True$,$False$}	$True$
rw_prob	p_rw = 1	Real	[0.00001,0.1]	0.0001
$tabu$	-	Categorical	{0,1,2}	1
$tabul$	$tabu$ = 1	Integer	[1,100]	7
$tabul2$	$tabu$ = 2	Integer	[1,100]	7

Table 3: The default configuration of PbO-MWC

Instantiation	Default Configuration
Default	bms=1, bn=50, bt=0, $cons$=0, $drop$=0, p_rs=0, p_rw=1, rw_prob=1.0E-4, $tabu$=1, $tabul$=7

Table 4: The optimized configurations of PbO-MWC for all benchmarks.

Benchmark/Instance Family	Optimized Configuration
BHOSLIB	bms=0, bt=1, $cons$=0, $drop$=1, p_rs=0, p_rw=1, rd_prob=0.3, rw_prob=0.08343949850000884, $tabu$=1, $tabul$=3
DIMACS (MANN family)	bms=0, bt=1, $cons$=0, $drop$=1, p_rs=1, p_rw=1, rd_prob=0.3, res_prob=3.874095018590378E-6, rw_prob=0.002592174400640285, $tabu$=0
DIMACS (except MANN family)	bms=0, bt=1, $cons$=0, $drop$=1, p_rs=1, p_rw=1, rd_prob=0.9, res_prob=5.134618899663661E-5, rw_prob=0.0809256555960982, $tabu$=0
KES	bms=1, bn=5, bt=0, $cons$=1, $drop$=2, p_rs=1, p_rw=0, res_prob=3.5200327579917024E-5, $tabu$=1, $tabul$=10
REF	bms=1, bn=22, bt=1, $cons$=2, $drop$=1, p_rs=1, p_rw=0, rd_prob=0.8, res_prob=7.696004591828833E-5, $tabu$=2, $tabul2$=2