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 = 0 : do not perform restart local search; p_rs = 1 : perform restart local search.
res_prob	the probability of performing restart local search, configured when p_rs = 1.
p_rw	p_rw = 0 : do not perform random walk component; p_rw = 1 : 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, 2.

Table 2: The configuration space of PbO-MWC.

Parameters	Depended Conditions	Parameter Type	Value Domain	Default Value
bms	-	Boolean-valued	{1,0}	1
bn	bms = 1	Integer	[1,100]	50
bt	-	Categorical	{1,0}	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	{1,0}	0
res_prob	p_rs = 1	Real	[0.0000001,0.0001]	0.000001
p_rw	-	Boolean-valued	{1,0}	1
rw_prob	p_rw = 1	Real	[0.00001,0.1]	0.0001
$tabu$	-	Categorical	{0,1,2}	1
$tabul$	$tabu$ = 1, 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*=1, *drop*=0, *p_rs=1*, *p_rw=1*, *res_prob*=5.016696977394702E-5, *rw_prob*=0.09733547356349166, *tabu*=1, *tabul*=5
DIMACS (MANN family)	*bms=0*, *bt*=1, *cons*=1, *drop*=1, *p_rs=0*, *p_rw=1*, *rd_prob*=0.1, *rw_prob*=0.0021339029487367554, *tabu*=0
DIMACS (except MANN family)	*bms=0*, *bt*=1, *cons*=0, *drop*=0, *p_rs=1*, *p_rw=1*, *res_prob*=3.459685410644107E-5, *rw_prob*=0.00994485968433248, *tabu*=1, *tabul*=8
KES	*bms=1*, *bn*=6, *bt*=1, *cons*=0, *drop*=2, *p_rs=1*, *p_rw=0*, *res_prob*=2.7775287025690946E-5, *tabu*=1, *tabul*=30
REF	*bms=1*, *bn*=16, *bt*=1, *cons*=0, *drop*=1, *p_rs=1*, *p_rw=0*, *rd_prob*=0.4, *res_prob*=9.44211698679448E-6, *tabu*=2, *tabul*=8