TABLE 1: The best and worst results of PERF. and MAPE/μRD in SMBO (DaL/DaL means the first is based on performance while the latter is based on accuracy). Abbreviation restricted to at most 3 words for model: DeepPerf-DeP, HINNPerf-HIP, SPLConquer-SPL, DCTART-DCT.

(a) MAPE and Performance

System	BOCA Best	BOCA Worst	ATConf Best	ATConf Worst	FLASH Best	FLASH Worst	OtterTune Best	OtterTune Worst	ResTune Best	ResTune Worst	ROBOTune Best	ROBOTune Worst	SMAC Best	SMAC Worst	Tuneful Best	Tuneful Worst
BROTLI	DT/RF	DaL/SVR	GP/DeP	RF/GP	SVR/DT	DT/SVR	DT/DEC	LR/SVR	DaL/RF	SVR/HIP	RF/RF	SVR/HIP	RF/DEC	GP/SVR	DaL/RF	SVR/HIP
LLVM	HIP/RF	DeP/GP	GP/LR	RF/GP	DT/SPL	DT/SVR	DaL/LR	DeP/SVR	HIP/LR	DEC/SVR	DaL/HIP	SVR/GP	DEC/RF	GP/GP	HIP/LR	SVR/GP
LRZIP	HIP/SPL	GP/HIP	RF/RF	LR/HIP	DT/DT	DT/LR	DT/DT	GP/LR	RF/SPL	SVR/HIP	DEC/RF	SPL/HIP	RF/DT	GP/LR	GP/RF	LR/HIP
XGBOOST	RF/DT	GP/SVR	GP/RF	DEC/DeP	DeP/HIP	GP/SVR	DeP/DT	SPL/SPL	GP/RF	SVR/SPL	DeP/RF	GP/SVR	DT/DT	GP/SVR	DeP/RF	LR/DeP
NOC-CM-LOG	RF/DEC	DaL/SPL	RF/RF	GP/SVR	RF/DT	RF/GP	RF/DT	DaL/GP	DeP/DT	SPL/GP	DeP/RF	SVR/GP	DeP/DT	DaL/LR	HIP/DT	SVR/GP
DEEPARCH	DeP/DT	SVR/SVR	HIP/RF	SPL/DeP	DeP/SPL	SPL/SVR	DaL/RF	GP/SVR	RF/RF	DT/SPL	HIP/RF	SVR/DeP	DT/DT	DaL/SVR	DaL/RF	SVR/DeP
BDBC	LR/DEC	RF/SVR	GP/DaL	RF/HIP	DeP/DaL	SVR/LR	DeP/DT	SVR/HIP	GP/DaL	SVR/HIP	RF/DaL	SVR/HIP	RF/DT	DaL/LR	HIP/DaL	SVR/HIP
HSQLDB	SPL/DEC	DEC/SVR	GP/DT	DeP/SVR	DaL/RF	SVR/SVR	DaL/DT	SVR/SVR	SPL/DT	SVR/SVR	HIP/HIP	SVR/GP	DT/DT	GP/GP	SPL/DT	SVR/SVR
DCONVERT	GP/RF	DeP/SVR	GP/RF	SVR/SVR	DaL/HIP	SVR/SVR	DT/HIP	SVR/SVR	DaL/DeP	DT/GP	HIP/DeP	SVR/SPL	RF/DEC	SVR/SVR	DaL/DeP	GP/GP
7Z	HIP/RF	GP/SVR	DaL/RF	RF/HIP	DeP/SPL	GP/SVR	DeP/DEC	GP/SVR	DaL/RF	GP/DeP	DEC/DT	GP/SVR	DEC/DT	GP/SVR	DaL/RF	GP/DeP
APACHE	DaL/DEC	SVR/DeP	DT/DEC	SVR/SVR	LR/LR	GP/DeP	HIP/DEC	SVR/DeP	DaL/DEC	SVR/HIP	DT/DEC	SPL/GP	RF/DEC	GP/DeP	DaL/DEC	SVR/HIP
HSMGP	LR/HIP	GP/SVR	GP/RF	RF/SVR	HIP/HIP	GP/SVR	DEC/HIP	SVR/SVR	GP/HIP	DEC/DeP	HIP/DaL	SVR/LR	HIP/DT	GP/SVR	GP/HIP	DEC/DeP
MONGODB	SPL/DEC	SVR/SVR	RF/RF	SVR/SVR	SPL/LR	SVR/SVR	DEC/LR	SVR/SVR	DaL/RF	DeP/DeP	HIP/RF	SVR/GP	RF/LR	SVR/SVR	LR/LR	DeP/DeP
POSTGRESQL	SVR/SVR	GP/DeP	DaL/DT	GP/SVR	DeP/DaL	SPL/SVR	DT/RF	GP/DeP	RF/DT	SVR/GP	DaL/HIP	SPL/GP	DEC/SVR	GP/DeP	RF/DT	SVR/GP
EXASTENCILS	DeP/RF	GP/DeP	RF/RF	SPL/SVR	DeP/DaL	GP/LR	DeP/DaL	GP/SVR	GP/RF	LR/GP	SPL/GP		RF/RF	GP/SVR	RF/RF	SPL/GP
KANZI	SPL/RF	RF/LR	SVR/RF	RF/HIP	RF/DeP	GP/LR	DEC/DT	GP/LR	GP/RF	DEC/HIP	HIP/RF	SVR/HIP	HIP/RF	GP/LR	SPL/RF	RF/HIP
JUMP3R	GP/RF	RF/LR	GP/RF	SVR/HIP	DT/DT	DeP/LR	GP/RF	RF/GP	GP/RF	RF/GP	RF/RF	DEC/LR	SVR/DT	DEC/LR	SPL/RF	DT/GP
MARIADB	SPL/DT	DaL/SVR	GP/DaL	RF/SVR	SPL/DT	DeP/SVR	DEC/DT	SVR/SVR	LR/DeP	SVR/SVR	DeP/DeP	SPL/GP	DEC/DT	SVR/GP	DT/DeP	SPL/GP
POLLY	DEC/DT	GP/LR	RF/RF	SVR/HIP	DEC/DEC	GP/SVR	HIP/DT	SVR/LR	DaL/SVR	GP/GP	RF/SVR	SVR/GP	RF/DT	GP/SVR	DaL/SVR	GP/GP
SQL	SVR/SVR	DeP/LR	DeP/SVR	SVR/DT	SPL/DaL	SVR/LR	LR/SVR	DeP/LR	RF/SVR	GP/LR	RF/RF	SVR/LR	SPL/RF	SVR/DeP	RF/RF	GP/LR
VP9	RF/DEC	GP/SVR	SPL/DEC	DT/SVR	LR/DEC	GP/SVR	DT/DEC	GP/SVR	SPL/DEC	GP/GP	RF/HIP	SVR/GP	DEC/DT	GP/SVR	SPL/DEC	GP/GP
SPARK	DaL/RF	DeP/DeP	DT/RF	LR/SVR	RF/DaL	GP/DeP	RF/DEC	SPL/DeP	RF/RF	GP/GP	DaL/RF	SPL/GP	RF/DEC	GP/DeP	DaL/RF	SPL/GP
HIPACC	SVR/RF	GP/SVR	GP/RF	RF/SVR	DaL/HIP	SVR/DaL	DaL/HIP	SVR/SVR	SPL/RF	DeP/DaL	DaL/DaL	SVR/RF	RF/RF	GP/SVR	SPL/RF	DeP/LR
REDIS	SVR/SVR	GP/DeP	DaL/GP	GP/DeP	SPL/SVR	SVR/DeP	HIP/DaL	LR/DeP	HIP/RF	RF/GP	SVR/SPL	LR/GP	DT/RF	GP/SVR	GP/SVR	SPL/GP
STORM	LR/RF	SVR/DT	GP/RF	RF/DT	RF/LR	RF/RF	GP/LR	DaL/DT	LR/RF	SVR/DT	LR/LR	SVR/DEC	DeP/RF	SVR/DT	DeP/RF	SPL/DT
SAC	DEC/HIP	DaL/DeP	DaL/RF	SPL/SVR	DaL/DEC	DeP/DeP	HIP/DEC	RF/DeP	DT/RF	LR/LR	RF/DeP	SVR/SPL	DEC/DEC	DeP/DeP	DeP/RF	SPL/LR
HADOOP	SVR/DeP	SPL/DeP	DT/GP	SPL/DeP	GP/SVR	DeP/DeP	DT/SVR	RF/DeP	DT/DeP	DeP/GP	LR/DeP	SVR/GP	SPL/SVR	SVR/DeP	HIP/DeP	SVR/GP
TOMCAT	RF/SVR	DaL/DeP	DT/RF	DaL/DeP	DT/SVR	DeP/DeP	DT/SVR	SVR/DeP	GP/RF	HIP/GP	RF/SVR	LR/GP	DEC/RF	GP/DeP	DaL/RF	LR/GP
JAVAGC	SPL/RF	DT/SVR	DeP/RF	GP/HIP	DEC/HIP	GP/SVR	DEC/DEC	GP/SVR	LR/RF	SVR/GP	HIP/RF	SVR/HIP	RF/RF	GP/HIP	LR/RF	GP/LR

(b) μRD and Performance

System	BOCA Best	BOCA Worst	ATConf Best	ATConf Worst	FLASH Best	FLASH Worst	OtterTune Best	OtterTune Worst	ResTune Best	ResTune Worst	ROBOTune Best	ROBOTune Worst	SMAC Best	SMAC Worst	Tuneful Best	Tuneful Worst
BROTLI	DT/RF	DaL/DeP	GP/DaL	RF/DeP	SVR/DeP	DT/DEC	DT/DaL	LR/SVR	DaL/RF	SVR/DeP	RF/RF	SVR/DeP	RF/RF	GP/DeP	DaL/DaL	SVR/DeP
LLVM	HIP/RF	DeP/DeP	GP/LR	RF/GP	DT/LR	DT/DEC	DaL/LR	DeP/DeP	HIP/SPL	DEC/GP	DaL/HIP	SVR/GP	DEC/RF	GP/DeP	HIP/LR	SVR/GP
LRZIP	HIP/DT	GP/GP	RF/SVR	LR/LR	DT/RF	DT/LR	DT/DT	GP/GP	RF/HIP	SVR/DEC	DEC/SVR	SVR/GP	RF/DT	GP/GP	GP/SVR	LR/SPL
XGBOOST	RF/RF	GP/SVR	GP/LR	DEC/GP	DeP/HIP	GP/SVR	DeP/HIP	SPL/SVR	GP/LR	SVR/SVR	RF/LR	LR/GP	DT/RF	GP/SVR	DeP/HIP	LR/GP
NOC-CM-LOG	RF/RF	DaL/GP	RF/RF	GP/GP	RF/DaL	RF/GP	RF/RF	DaL/GP	DeP/RF	SPL/GP	DeP/RF	SVR/GP	DeP/DT	DaL/GP	HIP/RF	SVR/GP
DEEPARCH	DeP/DT	SVR/SVR	HIP/LR	SPL/DeP	DeP/SPL	SPL/SVR	DaL/HIP	GP/SVR	RF/SPL	DT/DeP	HIP/LR	SVR/GP	DT/DT	DaL/SVR	DaL/RF	SVR/GP
BDBC	LR/RF	RF/GP	GP/RF	RF/SVR	DeP/HIP	SVR/SVR	DeP/DT	SVR/GP	GP/RF	SVR/SVR	RF/RF	SVR/GP	RF/DT	DaL/GP	HIP/RF	SVR/GP
HSQLDB	SPL/DT	DEC/SVR	GP/DT	DeP/DeP	DaL/RF	SVR/SVR	DaL/DT	SVR/SVR	SPL/HIP	SVR/SVR	HIP/HIP	SVR/GP	DT/RF	GP/GP	SPL/HIP	SVR/SVR
DCONVERT	GP/RF	DeP/SVR	GP/RF	SVR/DeP	DaL/HIP	SVR/SVR	DT/HIP	SVR/SVR	DaL/DeP	DT/GP	HIP/DeP	SVR/GP	RF/RF	SVR/SVR	DaL/RF	GP/GP
7Z	HIP/RF	GP/SVR	DaL/DaL	RF/DeP	DeP/HIP	SPL/SVR	DeP/DT	GP/SVR	DaL/RF	GP/DeP	RF/RF	SPL/DeP	DEC/RF	GP/SVR	DaL/RF	GP/DeP
APACHE	DaL/HIP	SVR/DeP	DT/LR	SVR/DeP	LR/LR	GP/DeP	HIP/HIP	SVR/DeP	DaL/HIP	SVR/DeP	DT/DaL	SPL/DeP	RF/SPL	GP/DeP	DaL/HIP	SVR/DeP
HSMGP	LR/HIP	GP/SVR	GP/HIP	RF/DeP	HIP/HIP	GP/SVR	DEC/HIP	SVR/SVR	GP/HIP	DEC/DeP	HIP/HIP	SVR/DeP	HIP/HIP	GP/SVR	GP/HIP	DEC/DeP
MONGODB	SPL/SPL	SVR/SVR	RF/LR	SVR/DeP	SPL/LR	SVR/SVR	DEC/SPL	SVR/SVR	DaL/LR	DeP/DeP	HIP/RF	SVR/GP	RF/LR	SVR/SVR	LR/LR	DeP/DeP
POSTGRESQL	SVR/SPL	GP/SVR	DaL/SPL	SVR/DeP	DeP/DaL	SPL/SVR	DT/RF	GP/GP	RF/DT	SVR/DeP	DaL/HIP	SPL/DeP	DEC/SPL	GP/SVR	RF/DT	SVR/DeP
EXASTENCILS	DeP/RF	GP/SVR	RF/RF	SPL/DeP	DeP/DaL	GP/LR	DeP/DaL	GP/SVR	GP/RF	LR/GP	GP/RF	SPL/DeP	RF/RF	GP/SVR	RF/RF	SPL/DeP
KANZI	SPL/DeP	RF/GP	SVR/SPL	RF/DeP	RF/DeP	GP/LR	DEC/DT	GP/GP	GP/RF	DEC/DeP	HIP/HIP	SVR/GP	HIP/RF	GP/GP	SPL/RF	RF/GP
JUMP3R	GP/DaL	RF/DeP	GP/RF	SVR/DEC	DeP/HIP	SVR/DEC	DT/DaL	DeP/SPL	GP/LR	RF/GP	RF/RF	SVR/GP	SVR/SVR	DEC/DeP	SPL/RF	DT/GP
MARIADB	SPL/RF	DaL/DeP	GP/RF	RF/SVR	SPL/DaL	DeP/DeP	DEC/DT	SVR/DeP	LR/RF	SVR/GP	DeP/RF	SPL/GP	DEC/RF	GP/DeP	DT/RF	SPL/GP
POLLY	DEC/RF	GP/SVR	RF/RF	SVR/GP	DEC/DaL	GP/LR	HIP/HIP	GP/GP	DaL/HIP	GP/GP	RF/HIP	SVR/GP	RF/RF	GP/GP	DaL/HIP	GP/GP
SQL	SVR/RF	DeP/DeP	DeP/RF	SVR/DEC	SPL/DT	SVR/DeP	LR/DEC	DeP/DeP	RF/SVR	GP/DEC	RF/RF	SVR/DEC	SPL/RF	SVR/GP	RF/SVR	GP/DEC
VP9	RF/DT	GP/GP	SPL/DT	DT/DeP	LR/DT	GP/SVR	DT/DT	GP/GP	SPL/DT	GP/GP	RF/DT	SVR/GP	DEC/DT	GP/GP	SPL/DT	GP/GP
SPARK	DaL/RF	GP/SVR	DT/RF	LR/DeP	RF/DaL	GP/SVR	RF/RF	SPL/DeP	RF/RF	DeP/DeP	DaL/RF	SPL/DeP	RF/RF	GP/SVR	DaL/RF	SPL/DeP
HIPACC	SVR/SPL	GP/SVR	GP/RF	RF/DeP	SVR/DaL	DeP/SVR	DaL/DaL	SVR/SVR	SPL/RF	DeP/DeP	DaL/RF	SVR/GP	RF/RF	GP/SVR	SPL/RF	DeP/DeP
REDIS	SVR/SPL	GP/DeP	DaL/RF	GP/GP	SPL/RF	SVR/DeP	HIP/DT	LR/DeP	HIP/RF	RF/DeP	SVR/SPL	LR/DeP	DT/DT	GP/DeP	GP/DEC	SPL/DeP
STORM	LR/DT	SVR/DeP	GP/RF	RF/SVR	RF/DaL	RF/DeP	GP/DaL	DaL/RF	LR/RF	SVR/GP	LR/RF	SVR/GP	DeP/DT	SVR/DeP	DeP/DT	SPL/GP
SAC	DEC/HIP	DaL/SVR	DaL/HIP	SPL/SVR	DaL/RF	DeP/SVR	HIP/DEC	RF/SVR	DT/SVR	LR/LR	RF/DeP	SVR/DEC	DEC/DT	DeP/SVR	DeP/SVR	SPL/LR
HADOOP	SVR/RF	SPL/DeP	DT/RF	SPL/DeP	GP/DT	DeP/DeP	DT/DaL	RF/DeP	DT/RF	DeP/DeP	LR/RF	SVR/GP	SPL/RF	SVR/DeP	HIP/RF	SPL/DeP
TOMCAT	RF/LR	DaL/SVR	DT/RF	DaL/GP	DT/DaL	DeP/DeP	DT/DaL	SVR/DeP	GP/LR	HIP/GP	RF/SPL	LR/GP	DEC/RF	GP/DeP	DaL/RF	LR/GP
JAVAGC	SPL/SPL	DT/SVR	DeP/RF	GP/SVR	DEC/HIP	GP/GP	DEC/DEC	GP/SVR	LR/SPL	SVR/GP	HIP/HIP	SVR/GP	RF/RF	GP/SVR	LR/SVR	GP/LR

TABLE 2: The best and worst results of EFF. and MAPE/µRD in SMBO. Formats are the same as Table 1.

(a) MAPE and Efficiency

System	BOCA Best	BOCA Worst	ATConf Best	ATConf Worst	FLASH Best	FLASH Worst	OtterTune Best	OtterTune Worst	ResTune Best	ResTune Worst	ROBOTune Best	ROBOTune Worst	SMAC Best	SMAC Worst	Tuneful Best	Tuneful Worst
BROTLI	GP/RF	DeP/SVR	LR/DeP	RF/GP	LR/DT	GP/SVR	SVR/DEC	DeP/SVR	LR/RF	SVR/HIP	DaL/RF	SVR/HIP	GP/DEC	DeP/SVR	SPL/RF	SVR/HIP
LLVM	HIP/RF	SVR/GP	SPL/LR	RF/GP	SPL/SPL	DeP/SVR	LR/LR	DeP/SVR	GP/LR	DEC/SVR	SPL/HIP	DT/GP	GP/RF	SVR/GP	GP/LR	DT/GP
LRZIP	DaL/SPL	HIP/HIP	RF/RF	SPL/HIP	SVR/DT	RF/LR	SVR/DT	DT/LR	SVR/SPL	DeP/HIP	GP/RF	DEC/HIP	GP/DT	DT/LR	HIP/RF	DEC/HIP
XGBOOST	RF/DT	GP/SVR	SPL/RF	DEC/DeP	RF/HIP	GP/SVR	DeP/DT	SVR/SPL	GP/RF	DT/SPL	GP/RF	RF/GP	DeP/DT	SVR/SVR	GP/RF	DeP/DeP
NOC-CM-LOG	GP/DEC	DaL/SPL	LR/RF	GP/SVR	DeP/DT	DaL/GP	SVR/DT	DaL/GP	DeP/DT	SPL/GP	SPL/RF	DEC/GP	GP/DT	DaL/LR	HIP/DT	DEC/GP
DEEPARCH	DeP/DT	GP/SVR	GP/RF	DT/DeP	RF/SPL	GP/SVR	DEC/RF	GP/SVR	GP/RF	DEC/SPL	GP/RF	DaL/DeP	RF/DT	SVR/SVR	LR/RF	DT/DeP
BDBC	DeP/DEC	DT/SVR	LR/DaL	DaL/HIP	RF/DaL	SVR/LR	RF/DT	SVR/LR	LR/DaL	RF/HIP	LR/DaL	DT/HIP	GP/DT	RF/LR	LR/DaL	RF/DeP
HSQLDB	GP/DEC	DT/SVR	SPL/DT	DeP/SVR	DaL/RF	SVR/SVR	RF/DT	SVR/SVR	LR/DT	DeP/SVR	GP/HIP	DeP/GP	GP/DT	DEC/GP	LR/DT	DEC/SVR
DCONVERT	HIP/RF	SVR/SVR	GP/RF	DEC/SVR	HIP/HIP	SVR/SVR	DT/HIP	SVR/SVR	GP/DeP	DEC/GP	SVR/DeP	DEC/SPL	GP/DEC	SVR/SVR	GP/DeP	RF/GP
7Z	DaL/RF	DT/SVR	DeP/RF	DT/HIP	DaL/DEC	GP/SVR	DaL/DEC	GP/SVR	DaL/RF	GP/DeP	RF/RF	DeP/GP	RF/DT	GP/SVR	DaL/RF	GP/DeP
APACHE	RF/DEC	DeP/DeP	SPL/DEC	DT/SVR	GP/LR	RF/DeP	GP/DEC	DeP/DeP	SVR/DEC	DeP/HIP	GP/DEC	DT/GP	GP/DEC	DEC/DeP	SVR/DEC	DeP/HIP
HSMGP	HIP/HIP	DT/SVR	SPL/RF	DEC/SVR	HIP/HIP	GP/SVR	HIP/HIP	SVR/SVR	LR/HIP	DEC/DeP	SPL/DaL	DeP/LR	SPL/DT	DEC/SVR	LR/HIP	DEC/DeP
MONGODB	RF/DEC	SVR/SVR	SPL/RF	DeP/SVR	LR/LR	SVR/SVR	GP/RF	DeP/DeP	SVR/RF	DT/GP	SPL/LR	GP/SVR	LR/LR	DT/DeP
POSTGRESQL	LR/SVR	DEC/DeP	GP/DT	DEC/DeP	GP/DaL	DEC/SVR	RF/RF	DT/DeP	DEC/DT	DeP/GP	DaL/HIP	DeP/GP	GP/SVR	DEC/DeP	SPL/DT	DeP/GP
EXASTENCILS	DEC/RF	GP/DeP	RF/RF	SPL/SVR	DaL/DaL	GP/LR	DaL/DaL	GP/SVR	GP/RF	LR/GP	GP/RF	DeP/GP	RF/RF	GP/SVR	RF/RF	LR/GP
KANZI	LR/RF	DT/LR	GP/RF	RF/HIP	RF/DeP	GP/LR	RF/DT	GP/LR	SVR/RF	DT/HIP	SVR/RF	DeP/HIP	SPL/RF	DT/LR	GP/RF	DEC/HIP
JUMP3R	GP/RF	DT/LR	SPL/RF	DEC/HIP	DeP/SPL	SVR/LR	GP/RF	RF/GP	GP/RF	RF/GP	SVR/RF	DaL/RF	HIP/DT	DT/LR	SPL/RF	DT/GP
MARIADB	LR/DT	RF/SVR	SPL/DaL	DEC/SVR	DT/DT	DeP/SVR	SPL/DT	DeP/SVR	SPL/DeP	RF/SVR	GP/DeP	DEC/GP	GP/DT	DeP/SVR	SPL/DeP	DeP/GP
POLLY	DEC/DT	GP/LR	RF/RF	HIP/HIP	DEC/DEC	SVR/SVR	DeP/DT	LR/LR	RF/SVR	SPL/GP	SVR/SVR	HIP/GP	DT/DT	SVR/SVR	RF/SVR	SPL/GP
SQL	DT/SVR	DeP/LR	DeP/SVR	DT/DT	DaL/DaL	DeP/SVR	SVR/SVR	DEC/LR	GP/SVR	DaL/LR	SVR/RF	DEC/LR	GP/RF	DeP/GP	GP/SVR	DEC/LR
VP9	RF/DEC	GP/SVR	GP/DEC	DT/SVR	RF/DEC	GP/SVR	RF/DEC	GP/SVR	GP/DEC	SPL/GP	DeP/HIP	DEC/GP	SPL/DT	GP/SVR	GP/DEC	SPL/GP
SPARK	SPL/RF	DaL/DeP	SVR/RF	DeP/SVR	RF/DaL	DeP/DeP	SVR/DEC	DaL/DeP	SPL/RF	DeP/GP	GP/RF	DeP/GP	GP/DEC	DaL/DeP	GP/RF	DeP/GP
HIPACC	GP/RF	DaL/SVR	SPL/RF	DT/SVR	RF/DaL	DeP/DeP	DEC/HIP	DeP/SVR	SPL/RF	DeP/DeP	DaL/RF	DeP/SVR	SPL/RF	DeP/RF	SPL/RF	DeP/LR
REDIS	HIP/SVR	GP/DeP	LR/GP	GP/DeP	GP/SVR	DaL/DeP	GP/DaL	RF/DeP	HIP/RF	DaL/GP	SPL/SPL	HIP/GP	GP/RF	SVR/DeP	LR/SVR	DEC/GP
STORM	GP/RF	SVR/DT	GP/RF	RF/DT	DeP/LR	DaL/RF	SPL/LR	DaL/DT	SPL/RF	HIP/DT	DeP/LR	SPL/DEC	DeP/RF	SVR/DT	LR/RF	GP/DT
SAC	DeP/HIP	DT/DeP	DeP/RF	LR/SVR	SPL/DEC	DeP/DeP	HIP/DEC	DeP/DeP	HIP/RF	LR/LR	SVR/DeP	SPL/SPL	GP/DEC	DeP/DeP	DeP/RF	GP/LR
HADOOP	RF/SVR	DEC/DeP	SPL/GP	DEC/DeP	LR/SVR	DeP/DeP	RF/SVR	DeP/DeP	SVR/DeP	DT/GP	RF/DeP	LR/GP	RF/SVR	DeP/DeP	DeP/DeP	DEC/GP
TOMCAT	GP/SVR	HIP/DeP	DEC/RF	SVR/DeP	GP/SVR	DeP/DeP	RF/SVR	DeP/DeP	GP/RF	DeP/GP	SPL/SVR	RF/GP	DaL/RF	LR/DeP	SPL/RF	DT/GP
JAVAGC	LR/RF	DeP/SVR	DaL/RF	GP/HIP	RF/HIP	SVR/SVR	RF/DEC	GP/SVR	LR/RF	GP/DeP	GP/RF	DeP/HIP	SPL/RF	DeP/HIP	DaL/RF	GP/LR

(b) µRD and Efficiency

System	BOCA Best	BOCA Worst	ATConf Best	ATConf Worst	FLASH Best	FLASH Worst	OtterTune Best	OtterTune Worst	ResTune Best	ResTune Worst	ROBOTune Best	ROBOTune Worst	SMAC Best	SMAC Worst	Tuneful Best	Tuneful Worst
BROTLI	GP/RF	DeP/DeP	LR/DaL	RF/DeP	LR/DeP	GP/DEC	SVR/DaL	DeP/SVR	LR/RF	SVR/DeP	DaL/RF	SVR/DeP	GP/RF	DeP/DeP	SPL/DaL	SVR/DeP
LLVM	HIP/RF	SVR/DeP	SPL/LR	RF/GP	SPL/LR	DeP/DEC	LR/LR	DeP/DeP	GP/SPL	DEC/GP	SPL/HIP	DT/GP	GP/RF	SVR/DeP	GP/LR	DT/GP
LRZIP	DaL/DT	HIP/GP	RF/SVR	SPL/LR	SVR/RF	RF/LR	SVR/DT	DT/GP	SVR/HIP	DeP/DEC	GP/DeP	DEC/HIP	GP/DT	DT/GP	HIP/SVR	DEC/SPL
XGBOOST	RF/RF	GP/SVR	SPL/LR	DEC/GP	RF/HIP	GP/SVR	DeP/HIP	SVR/SVR	GP/LR	DT/SVR	GP/LR	RF/GP	DeP/RF	SVR/SVR	GP/HIP	GP/GP
NOC-CM-LOG	GP/RF	DaL/GP	LR/RF	GP/GP	DeP/DaL	DaL/GP	SVR/RF	DaL/GP	DeP/RF	SPL/GP	SPL/RF	DEC/GP	GP/DT	DaL/GP	HIP/RF	DEC/GP
DEEPARCH	DeP/DT	GP/SVR	GP/LR	DT/GP	RF/HIP	GP/SVR	DEC/HIP	GP/SVR	GP/SPL	DEC/DeP	GP/LR	DaL/GP	RF/DT	SVR/SVR	LR/RF	DT/GP
BDBC	DeP/RF	DT/GP	LR/RF	DaL/SVR	RF/HIP	SVR/SVR	RF/DT	SVR/GP	LR/RF	RF/SVR	LR/RF	DT/GP	GP/DT	RF/GP	LR/RF	RF/GP
HSQLDB	GP/DT	DT/SVR	SPL/DT	DeP/DeP	DaL/RF	SVR/SVR	RF/DT	SVR/SVR	LR/HIP	DeP/SVR	GP/HIP	DeP/GP	GP/RF	DEC/GP	LR/HIP	DEC/SVR
DCONVERT	HIP/RF	SVR/SVR	GP/RF	DEC/DeP	HIP/HIP	GP/SVR	DT/HIP	SVR/SVR	GP/DeP	DEC/GP	GP/DeP	DEC/GP	GP/RF	SVR/SVR	GP/RF	RF/GP
7Z	DaL/RF	DT/SVR	DeP/DaL	DT/DeP	DaL/HIP	GP/SVR	DaL/DT	GP/SVR	DaL/RF	GP/DeP	RF/RF	DeP/DeP	RF/RF	GP/SVR	DaL/RF	GP/DeP
APACHE	RF/HIP	DeP/DeP	SPL/LR	DT/DeP	GP/LR	RF/DeP	GP/HIP	DeP/DeP	SVR/HIP	DeP/DeP	GP/DaL	DT/DeP	GP/SPL	DEC/DeP	SVR/HIP	DeP/DeP
HSMGP	HIP/HIP	DT/SVR	SPL/HIP	DEC/DeP	HIP/HIP	GP/SVR	HIP/HIP	SVR/SVR	LR/HIP	DEC/DeP	SPL/HIP	DeP/DeP	SPL/HIP	DEC/SVR	LR/HIP	DEC/DeP
MONGODB	RF/SPL	SVR/SVR	SPL/LR	DeP/DeP	LR/LR	SVR/SVR	LR/SPL	SVR/SVR	GP/LR	DeP/DeP	SVR/RF	DT/GP	SPL/LR	GP/SVR	LR/LR	DT/DeP
POSTGRESQL	LR/SPL	DEC/SVR	GP/SPL	DEC/DeP	GP/DaL	DEC/SVR	RF/RF	DT/GP	DEC/DT	DeP/DeP	DaL/HIP	DeP/DeP	GP/SPL	DEC/DeP	SPL/DT	DeP/DeP
EXASTENCILS	DEC/RF	GP/SVR	RF/RF	SPL/DeP	DaL/DaL	GP/LR	DaL/DaL	GP/SVR	GP/RF	LR/DeP	GP/RF	DeP/DeP	RF/RF	GP/SVR	RF/RF	LR/DeP
KANZI	LR/DeP	DT/GP	GP/SPL	RF/DeP	RF/DeP	GP/GP	GP/DaL	GP/LR	SVR/HIP	DT/DeP	SVR/HIP	DeP/GP	SPL/RF	DT/GP	GP/RF	DEC/GP
JUMP3R	GP/DaL	DT/DeP	SPL/RF	DEC/DeP	DeP/HIP	SVR/DEC	GP/DaL	DEC/SPL	GP/LR	RF/GP	SVR/RF	DaL/GP	HIP/SVR	DT/DeP	SPL/RF	DT/GP
MARIADB	LR/RF	RF/DeP	SPL/RF	DEC/SVR	DT/DaL	DeP/DeP	SPL/DT	DeP/DeP	SPL/RF	RF/GP	GP/RF	DEC/GP	GP/RF	DeP/DeP	SPL/RF	DeP/GP
POLLY	DEC/RF	GP/SVR	RF/RF	HIP/GP	DEC/DaL	SVR/DeP	DeP/HIP	LR/LR	RF/HIP	SPL/GP	DT/RF	SVR/GP	GP/RF	DeP/GP	RF/HIP	SPL/GP
SQL	DT/RF	DeP/DeP	DeP/RF	DT/DEC	DaL/DT	DeP/DeP	SVR/DEC	DEC/DeP	GP/SVR	DaL/DEC	SVR/RF	DEC/DEC	GP/RF	DeP/GP	GP/SVR	DEC/DEC
VP9	RF/DT	GP/GP	GP/DT	DT/DeP	RF/DT	GP/SVR	RF/DT	GP/GP	GP/DT	SPL/GP	DeP/DT	DEC/GP	SPL/DT	GP/GP	GP/DT	SPL/GP
SPARK	SPL/RF	DaL/SVR	SVR/RF	DeP/DeP	RF/DaL	DeP/SVR	SVR/RF	DaL/RF	SPL/RF	DeP/DeP	GP/RF	DeP/GP	GP/RF	DaL/SVR	GP/RF	DeP/DeP
HIPACC	GP/SPL	DaL/SVR	SPL/RF	DT/DeP	RF/DaL	DeP/SVR	DEC/DaL	DeP/SVR	SPL/RF	DeP/DeP	SVR/RF	DeP/GP	DaL/RF	DeP/SVR	SPL/RF	DeP/DeP
REDIS	HIP/SPL	GP/DeP	LR/RF	GP/GP	GP/RF	DaL/DeP	GP/DT	RF/DeP	HIP/RF	DaL/DeP	SPL/SPL	HIP/DeP	GP/DT	SVR/DeP	LR/DEC	DEC/DeP
STORM	GP/DT	SVR/HIP	GP/RF	RF/SVR	DeP/DaL	DaL/DeP	SPL/DaL	DaL/DT	SPL/RF	HIP/SVR	SVR/DeP	SPL/GP	GP/DT	SVR/DeP	LR/DT	GP/GP
SAC	DeP/HIP	DT/SVR	DeP/HIP	LR/SVR	SPL/RF	DeP/SVR	HIP/DEC	DeP/SVR	HIP/SVR	LR/LR	SVR/DeP	SPL/DEC	GP/DT	DeP/SVR	DeP/SVR	GP/LR
HADOOP	RF/RF	DEC/DeP	SPL/RF	DEC/DeP	LR/DT	DeP/DeP	RF/DaL	DeP/DeP	SVR/RF	DT/DeP	RF/RF	LR/DeP	RF/RF	DeP/DeP	DeP/RF	DEC/DeP
TOMCAT	GP/LR	HIP/SVR	DEC/RF	SVR/GP	GP/DaL	DeP/DeP	RF/DaL	DeP/DeP	GP/LR	DeP/GP	SPL/SPL	DeP/GP	DaL/RF	LR/DeP	SPL/RF	DT/GP
JAVAGC	LR/SPL	DeP/SVR	DaL/RF	GP/SVR	RF/HIP	SVR/GP	RF/DEC	GP/SVR	LR/SPL	GP/GP	GP/HIP	DeP/GP	SPL/RF	DeP/SVR	DaL/SVR	GP/LR

TABLE 3: The best and worst results of PERF. and MAPE/μRD in BMBO. Formats are the same as Table 1.

(a) MAPE and Performance

System	BestConfig Best	Worst	Irace Best	Worst	GGA Best	Worst	ParamILS Best	Worst	R_search Best	Worst	GA Best	Worst	SWAY Best	Worst	ConEx Best	Worst	E_search Best	Worst
BROTLI	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/DaL	GP/SPL
LLVM	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	DeP/GP
LRZIP	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/GP	LR/LR
XGBOOST	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	DT/SPL
NOC-CM-LOG	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/DT	GP/SPL
DEEPARCH	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	SVR/SPL
BDBC	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/DT	DeP/LR
HSQLDB	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/DaL	DT/GP
DCONVERT	RF/DT	DeP/SPL	GP/DT	SVR/SPL	DT/DT	SVR/SPL	DaL/DT	SVR/SPL	RF/DT	SPL/SPL	HIP/DT	SVR/SPL	HIP/DT	SVR/SPL	HIP/DT	SVR/SPL	-/-	-/-
7Z	RF/DT	DeP/LR	DaL/DT	SVR/LR	RF/DT	DeP/LR	RF/DT	SVR/LR	DaL/DT	SPL/LR	DaL/DT	DeP/LR	DT/DT	SVR/LR	DaL/DT	GP/LR	-/-	-/-
APACHE	SPL/LR	DaL/DeP	RF/LR	DeP/DeP	SPL/LR	DeP/DeP	SPL/LR	DeP/DeP	RF/LR	DeP/DeP	RF/LR	DeP/DeP	RF/LR	DeP/DeP	RF/LR	DeP/DeP	-/-	-/-
HSMGP	DaL/HIP	DeP/LR	RF/HIP	SVR/LR	HIP/HIP	DeP/LR	HIP/HIP	DeP/LR	HIP/HIP	SPL/LR	DaL/HIP	DeP/LR	HIP/HIP	DeP/LR	HIP/HIP	DeP/LR	-/-	-/-
MONGODB	HIP/RF	SVR/SPL	LR/RF	SVR/SPL	LR/RF	SVR/SPL	LR/RF	SVR/SPL	LR/RF	SPL/SPL	HIP/RF	SVR/SPL	SPL/RF	SVR/SPL	SPL/RF	SVR/SPL	-/-	-/-
POSTGRESQL	RF/DEC	DeP/SPL	DEC/DEC	SVR/SPL	DEC/DEC	DeP/SPL	RF/DEC	HIP/SPL	GP/DEC	SPL/SPL	RF/DEC	DeP/SPL	RF/DEC	DeP/SPL	RF/DEC	DeP/SPL	-/-	-/-
EXASTENCILS	LR/RF	HIP/SPL	RF/RF	HIP/SPL	RF/RF	HIP/SPL	RF/RF	HIP/SPL	RF/RF	SPL/SPL	RF/RF	SVR/SPL	RF/RF	HIP/SPL	RF/RF	HIP/SPL	-/-	-/-
KANZI	SVR/RF	LR/LR	RF/RF	GP/LR	RF/RF	GP/LR	RF/RF	GP/LR	RF/RF	GP/LR	RF/RF	GP/LR	RF/RF	GP/LR	RF/RF	GP/LR	-/-	-/-
JUMP3R	DaL/RF	LR/LR	SVR/RF	SPL/LR	SVR/RF	SPL/LR	SVR/RF	LR/LR	SVR/RF	HIP/LR	SVR/RF	GP/LR	SVR/RF	LR/LR	SVR/RF	GP/LR	-/-	-/-
MARIADB	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	SPL/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	-/-	-/-
POLLY	DaL/RF	LR/LR	RF/RF	SVR/LR	RF/RF	SVR/LR	RF/RF	SVR/LR	RF/RF	SVR/LR	DaL/RF	SVR/LR	RF/RF	SVR/LR	RF/RF	SVR/LR	-/-	-/-
SQL	SVR/RF	DeP/SPL	RF/RF	LR/SPL	RF/RF	GP/SPL	RF/RF	GP/SPL	DeP/RF	HIP/SPL	DaL/RF	GP/SPL	DaL/RF	GP/SPL	RF/RF	DT/SPL	-/-	-/-
VP9	RF/DT	LR/SVR	LR/DT	SVR/SVR	RF/DT	SVR/SVR	RF/DT	SVR/SVR	HIP/DT	SVR/SVR	RF/DT	SVR/SVR	HIP/DT	SVR/SVR	RF/DT	SVR/SVR	-/-	-/-
SPARK	LR/RF	DT/SVR	RF/RF	SVR/SVR	RF/RF	SPL/SVR	RF/RF	SVR/SVR	RF/RF	SVR/SVR	DaL/RF	GP/SVR	RF/RF	DeP/SVR	RF/RF	SVR/SVR	-/-	-/-
HIPACC	HIP/DT	LR/SPL	DaL/DT	DeP/SPL	RF/DT	DeP/SPL	RF/DT	DeP/SPL	RF/DT	SPL/SPL	RF/DT	DeP/SPL	RF/DT	SVR/SPL	RF/DT	DeP/SPL	-/-	-/-
REDIS	DaL/SVR	DT/DeP	RF/SVR	GP/DeP	RF/SVR	HIP/DeP	RF/SVR	DeP/DeP	RF/SVR	DeP/DeP	RF/SVR	DeP/DeP	RF/SVR	DT/DeP	RF/SVR	DT/DeP	-/-	-/-
STORM	DaL/RF	DeP/DT	DaL/RF	DeP/DT	RF/RF	DeP/DT	DaL/RF	DeP/DT	RF/RF	SPL/DT	RF/RF	DeP/DT	DaL/RF	DeP/DT	RF/RF	DeP/DT	-/-	-/-
SAC	LR/DT	DeP/SPL	RF/DT	DEC/SPL	SPL/DT	DeP/SPL	SPL/DT	DeP/SPL	DEC/DT	SPL/SPL	DT/DT	DeP/SPL	DT/DT	SVR/SPL	RF/DT	DeP/SPL	-/-	-/-
HADOOP	RF/RF	SPL/DeP	RF/RF	DeP/DeP	RF/RF	HIP/DeP	RF/RF	HIP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	-/-	-/-
TOMCAT	RF/RF	DT/DeP	RF/RF	DeP/DeP	DaL/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	SVR/DeP	-/-	-/-
JAVAGC	LR/DT	SVR/LR	RF/DT	SVR/LR	RF/DT	SVR/LR	RF/DT	DeP/LR	RF/DT	SPL/LR	DaL/DT	SVR/LR	DT/DT	SVR/LR	RF/DT	SVR/LR	-/-	-/-

(b) μRD and Performance

System	BestConfig Best	Worst	Irace Best	Worst	GGA Best	Worst	ParamILS Best	Worst	R_search Best	Worst	GA Best	Worst	SWAY Best	Worst	ConEx Best	Worst	E_search Best	Worst
BROTLI	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/DT	GP/DeP
LLVM	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	DeP/SVR
LRZIP	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/SVR	LR/LR
XGBOOST	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	DT/SVR
NOC-CM-LOG	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/RF	GP/SPL
DEEPARCH	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	SVR/SVR
BDBC	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/DT	DeP/SVR
HSQLDB	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	DT/GP
DCONVERT	RF/DT	DeP/SPL	GP/DT	SVR/SPL	DT/DT	SVR/SPL	DaL/DT	SVR/SPL	RF/DT	SPL/SPL	HIP/DT	SVR/SPL	DT/DT	SVR/SPL	DaL/DT	SVR/SPL	-/-	-/-
7Z	RF/DT	DeP/SPL	DaL/DT	SVR/SPL	RF/DT	DeP/SPL	RF/DT	SVR/SPL	DaL/DT	SPL/SPL	DaL/DT	DeP/SPL	DT/DT	SVR/SPL	DaL/DT	GP/SPL	-/-	-/-
APACHE	SPL/LR	DaL/DeP	RF/LR	DeP/DeP	SPL/LR	DeP/DeP	SPL/LR	DeP/DeP	SPL/LR	DeP/DeP	RF/LR	DeP/DeP	RF/LR	DeP/DeP	RF/LR	DeP/DeP	-/-	-/-
HSMGP	DaL/HIP	DeP/SPL	RF/HIP	SVR/SPL	HIP/HIP	DeP/SPL	HIP/HIP	DeP/SPL	HIP/HIP	SPL/SPL	DaL/HIP	DeP/SPL	HIP/HIP	DeP/SPL	HIP/HIP	DeP/SPL	-/-	-/-
MONGODB	HIP/RF	SVR/SPL	LR/RF	SVR/SPL	LR/RF	SVR/SPL	LR/RF	SVR/SPL	LR/RF	SPL/SPL	HIP/RF	SVR/SPL	SPL/RF	SVR/SPL	SPL/RF	SVR/SPL	-/-	-/-
POSTGRESQL	RF/DT	DeP/SPL	DEC/DT	SVR/SPL	DEC/DT	DeP/SPL	RF/DT	HIP/SPL	GP/DT	SPL/SPL	RF/DT	DeP/SPL	RF/DT	DeP/SPL	RF/DT	DeP/SPL	-/-	-/-
EXASTENCILS	LR/RF	HIP/SPL	RF/RF	HIP/SPL	RF/RF	HIP/SPL	RF/RF	HIP/SPL	RF/RF	SPL/SPL	RF/RF	SVR/SPL	RF/RF	HIP/SPL	RF/RF	HIP/SPL	-/-	-/-
KANZI	SVR/RF	LR/GP	RF/RF	GP/GP	RF/RF	GP/GP	RF/RF	GP/GP	RF/RF	GP/GP	RF/RF	GP/GP	RF/RF	GP/GP	RF/RF	GP/GP	-/-	-/-
JUMP3R	SVR/SVR	SPL/GP	SVR/SVR	SPL/GP	SVR/SVR	LR/GP	SVR/SVR	LR/GP	SVR/SVR	HIP/GP	SVR/SVR	GP/GP	SVR/SVR	LR/GP	SVR/SVR	GP/GP	-/-	-/-
MARIADB	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	SPL/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	-/-	-/-
POLLY	DaL/RF	LR/LR	RF/RF	SVR/LR	RF/RF	SVR/LR	RF/RF	LR/LR	RF/RF	SVR/LR	DaL/RF	SVR/LR	RF/RF	SVR/LR	RF/RF	SVR/LR	-/-	-/-
SQL	SVR/RF	DeP/SPL	RF/RF	LR/SPL	RF/RF	GP/SPL	RF/RF	GP/SPL	DeP/RF	HIP/SPL	DaL/RF	GP/SPL	DaL/RF	GP/SPL	RF/RF	DT/SPL	-/-	-/-
VP9	RF/DT	LR/SVR	LR/DT	SVR/SVR	RF/DT	SVR/SVR	RF/DT	SVR/SVR	HIP/DT	SVR/SVR	RF/DT	SVR/SVR	HIP/DT	SVR/SVR	RF/DT	SVR/SVR	-/-	-/-
SPARK	LR/RF	DT/SVR	RF/RF	SVR/SVR	RF/RF	SPL/SVR	RF/RF	SVR/SVR	RF/RF	SVR/SVR	DaL/RF	GP/SVR	RF/RF	DeP/SVR	RF/RF	SVR/SVR	-/-	-/-
HIPACC	HIP/DT	LR/SPL	DaL/DT	DeP/SPL	RF/DT	DeP/SPL	RF/DT	DeP/SPL	RF/DT	SPL/SPL	RF/DT	DeP/SPL	RF/DT	SVR/SPL	RF/DT	DeP/SPL	-/-	-/-
REDIS	DaL/RF	DT/DeP	RF/RF	GP/DeP	RF/RF	HIP/DeP	RF/RF	DeP/DeP	RF/RF	DT/DeP	RF/RF	DeP/DeP	RF/RF	DT/DeP	RF/RF	DT/DeP	-/-	-/-
STORM	DaL/DT	DeP/SPL	DaL/RF	DeP/SPL	RF/DT	DeP/SPL	DaL/RF	DeP/SPL	RF/DT	SPL/SPL	RF/DT	DeP/SPL	DaL/RF	DeP/SPL	RF/DT	DeP/SPL	-/-	-/-
SAC	LR/DT	DeP/DeP	RF/DT	DEC/DeP	SPL/DT	DeP/DeP	SPL/DT	DeP/DeP	DEC/DT	SPL/DeP	DT/DT	DeP/DeP	DT/DT	SVR/DeP	RF/DT	DeP/DeP	-/-	-/-
HADOOP	RF/RF	SPL/DeP	RF/RF	SVR/DeP	RF/RF	HIP/DeP	RF/RF	HIP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	GP/DeP	-/-	-/-
TOMCAT	RF/RF	DT/SVR	RF/RF	DeP/SVR	DaL/RF	DeP/SVR	RF/RF	DeP/SVR	RF/RF	DeP/SVR	RF/RF	DeP/SVR	RF/RF	DeP/SVR	RF/RF	SVR/SVR	-/-	-/-
JAVAGC	LR/DT	SVR/SPL	RF/DT	SVR/SPL	RF/DT	SVR/SPL	RF/DT	DeP/SPL	RF/DT	SPL/SPL	DaL/DT	SVR/SPL	DT/DT	SVR/SPL	RF/DT	SVR/SPL	-/-	-/-

TABLE 4: The best and worst results of EFF. and MAPE/µRD in BMBO. Formats are the same as Table 1.

(a) MAPE and Efficiency

System	BestConfig Best	Worst	Irace Best	Worst	GGA Best	Worst	ParamILS Best	Worst	R_search Best	Worst	GA Best	Worst	SWAY Best	Worst	ConEx Best	Worst	E_search Best	Worst
BROTLI	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/DaL	DeP/SPL
LLVM	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	HIP/RF	SVR/GP
LRZIP	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/GP	SPL/LR
XGBOOST	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	SVR/SPL
NOC-CM-LOG	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/DT	GP/SPL
DEEPARCH	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	LR/SPL
BDBC	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	DEC/DT	HIP/LR
HSQLDB	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/DaL	SPL/GP
DCONVERT	DeP/DT	DT/SPL	DaL/DT	DEC/SPL	DaL/DT	SVR/SPL	HIP/DT	DeP/SPL	DEC/DT	SPL/SPL	SPL/DT	SVR/SPL	RF/DT	SVR/SPL	DEC/DT	SVR/SPL	-/-	-/-
7Z	RF/DT	SVR/LR	DT/DT	GP/LR	DaL/DT	SVR/LR	RF/DT	LR/LR	DT/DT	SPL/LR	DaL/DT	GP/LR	RF/DT	SVR/LR	DaL/DT	GP/LR	-/-	-/-
APACHE	SPL/LR	DT/DeP	SPL/LR	DaL/DeP	SPL/LR	DeP/DeP	LR/LR	DT/DeP	SPL/LR	DeP/DeP	SPL/LR	GP/DeP	SVR/LR	DeP/DeP	LR/LR	GP/DeP	-/-	-/-
HSMGP	DaL/HIP	SPL/LR	RF/HIP	DeP/LR	RF/HIP	SVR/LR	HIP/HIP	DEC/LR	HIP/HIP	SPL/LR	RF/HIP	GP/LR	LR/HIP	SVR/LR	HIP/HIP	DeP/LR	-/-	-/-
MONGODB	GP/RF	SPL/SPL	SVR/RF	GP/SPL	RF/RF	SVR/SPL	LR/RF	DEC/SPL	DEC/RF	SPL/SPL	SPL/RF	SVR/SPL	GP/RF	SVR/SPL	HIP/RF	SVR/SPL	-/-	-/-
POSTGRESQL	DeP/DEC	DaL/SPL	LR/DEC	HIP/SPL	HIP/DEC	DT/SPL	DeP/DEC	DT/SPL	RF/DEC	SPL/SPL	SPL/DEC	HIP/SPL	DaL/DEC	GP/SPL	DT/DEC	DeP/SPL	-/-	-/-
EXASTENCILS	DaL/RF	GP/SPL	GP/RF	DeP/SPL	RF/RF	GP/SPL	DeP/RF	SVR/SPL	DT/RF	GP/SPL	DEC/RF	GP/SPL	DeP/RF	GP/SPL	DT/RF	SVR/SPL	-/-	-/-
KANZI	DeP/RF	DT/LR	GP/RF	RF/LR	RF/RF	DeP/LR	RF/RF	DEC/LR	RF/RF	GP/LR	RF/RF	SVR/LR	SVR/RF	SVR/LR	RF/RF	DeP/LR	-/-	-/-
JUMP3R	RF/RF	DeP/LR	LR/RF	SPL/LR	SVR/RF	SPL/LR	SVR/RF	DT/LR	SVR/RF	LR/LR	DT/RF	DeP/LR	SVR/RF	SPL/LR	SVR/RF	GP/LR	-/-	-/-
MARIADB	GP/RF	DeP/DeP	DT/RF	LR/DeP	DT/RF	DeP/DeP	LR/RF	DeP/DeP	HIP/RF	SPL/DeP	DT/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	-/-	-/-
POLLY	GP/RF	DeP/LR	RF/RF	DEC/LR	HIP/RF	LR/LR	SVR/RF	LR/LR	DEC/RF	LR/LR	GP/RF	HIP/LR	GP/RF	DT/LR	SPL/RF	LR/LR	-/-	-/-
SQL	DeP/RF	DT/SPL	SVR/RF	LR/SPL	DeP/RF	LR/SPL	GP/RF	DT/SPL	DT/RF	LR/SPL	LR/RF	DT/SPL	GP/RF	DEC/SPL	LR/RF	DEC/SPL	-/-	-/-
VP9	DeP/DT	DT/SVR	RF/DT	DeP/SVR	DeP/DT	SVR/SVR	HIP/DT	SVR/SVR	HIP/DT	SVR/SVR	DaL/DT	GP/SVR	DT/DT	RF/SVR	HIP/DT	SVR/SVR	-/-	-/-
SPARK	LR/RF	GP/SVR	GP/RF	DaL/SVR	LR/RF	GP/SVR	LR/RF	DeP/SVR	DaL/RF	SVR/SVR	DEC/RF	GP/SVR	DT/RF	SPL/SVR	DaL/RF	LR/SVR	-/-	-/-
HIPACC	DeP/DT	SVR/SPL	HIP/DT	GP/SPL	RF/DT	LR/SPL	DaL/DT	SVR/SPL	RF/DT	SPL/SPL	DaL/DT	SVR/SPL	LR/DT	SVR/SPL	RF/DT	DeP/SPL	-/-	-/-
REDIS	DT/SVR	DeP/DeP	GP/SVR	HIP/DeP	DT/SVR	SVR/DeP	HIP/SVR	SVR/DeP	GP/SVR	DaL/DeP	DaL/SVR	DT/DeP	DEC/SVR	DeP/DeP	DEC/SVR	GP/DeP	-/-	-/-
STORM	DeP/RF	DT/DT	SPL/RF	RF/DT	LR/RF	DeP/DT	RF/RF	DeP/DT	DaL/RF	SPL/DT	GP/RF	DeP/DT	SVR/RF	LR/DT	SPL/RF	DaL/DT	-/-	-/-
SAC	SPL/DT	DeP/SPL	SPL/DT	SVR/SPL	DEC/DT	SVR/SPL	DaL/DT	DeP/SPL	DT/DT	LR/SPL	DT/DT	DeP/SPL	DT/DT	SVR/SPL	DEC/DT	SVR/SPL	-/-	-/-
HADOOP	DT/RF	GP/DeP	SVR/RF	LR/DeP	DEC/RF	HIP/DeP	DaL/RF	HIP/DeP	GP/RF	DeP/DeP	DEC/RF	DeP/DeP	HIP/RF	DT/DeP	DaL/RF	RF/DeP	-/-	-/-
TOMCAT	DEC/RF	SVR/DeP	SVR/RF	DeP/DeP	RF/RF	SPL/DeP	GP/RF	RF/DeP	RF/RF	SVR/DeP	DaL/RF	HIP/DeP	DEC/RF	DT/DeP	DEC/RF	SPL/DeP	-/-	-/-
JAVAGC	DeP/DT	SVR/LR	DaL/DT	GP/LR	HIP/DT	GP/LR	DEC/DT	SVR/LR	DT/DT	SVR/LR	DaL/DT	DeP/LR	DaL/DT	GP/LR	RF/DT	SVR/LR	-/-	-/-

(b) µRD and Efficiency

System	BestConfig Best	Worst	Irace Best	Worst	GGA Best	Worst	ParamILS Best	Worst	R_search Best	Worst	GA Best	Worst	SWAY Best	Worst	ConEx Best	Worst	E_search Best	Worst
BROTLI	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/DT	DeP/DeP
LLVM	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	HIP/RF	SVR/SVR
LRZIP	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/SVR	SPL/LR
XGBOOST	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	SVR/SVR
NOC-CM-LOG	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	SVR/RF	GP/SPL
DEEPARCH	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	LR/SVR
BDBC	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	DEC/DT	HIP/SVR
HSQLDB	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	RF/RF	SPL/GP
DCONVERT	DeP/DT	DT/SPL	DaL/DT	DEC/SPL	DaL/DT	SVR/SPL	HIP/DT	DeP/SPL	DEC/DT	SPL/SPL	SPL/DT	SVR/SPL	RF/DT	SVR/SPL	DaL/DT	GP/SPL	-/-	-/-
7Z	RF/DT	SVR/SPL	DT/DT	GP/SPL	DaL/DT	SVR/SPL	RF/DT	LR/SPL	DT/DT	SPL/SPL	DaL/DT	GP/SPL	RF/DT	SVR/SPL	DaL/DT	GP/SPL	-/-	-/-
APACHE	SPL/LR	DT/DeP	SPL/LR	DaL/DeP	SPL/LR	DeP/DeP	LR/LR	DT/DeP	SPL/LR	DeP/DeP	SPL/LR	GP/DeP	SVR/LR	DeP/DeP	LR/LR	GP/DeP	-/-	-/-
HSMGP	DaL/HIP	SPL/SPL	RF/HIP	DeP/SPL	RF/HIP	SVR/SPL	HIP/HIP	DEC/SPL	HIP/HIP	SPL/SPL	RF/HIP	GP/SPL	LR/HIP	SVR/SPL	HIP/HIP	DeP/SPL	-/-	-/-
MONGODB	GP/RF	SPL/SPL	SVR/RF	GP/SPL	RF/RF	SVR/SPL	LR/RF	DEC/SPL	DEC/RF	SPL/SPL	SPL/RF	SVR/SPL	GP/RF	SVR/SPL	HIP/RF	SVR/SPL	-/-	-/-
POSTGRESQL	DeP/DT	DaL/SPL	LR/DT	HIP/SPL	HIP/DT	DT/SPL	DeP/DT	DT/SPL	RF/DT	SPL/SPL	SPL/DT	HIP/SPL	DaL/DT	GP/SPL	DT/DT	DeP/SPL	-/-	-/-
EXASTENCILS	DaL/RF	GP/SPL	GP/RF	DeP/SPL	RF/RF	GP/SPL	DeP/RF	SVR/SPL	DeP/RF	SVR/SPL	DEC/RF	GP/SPL	DeP/RF	GP/SPL	DT/RF	SVR/SPL	-/-	-/-
KANZI	DeP/RF	DT/GP	GP/RF	RF/GP	RF/RF	DeP/GP	RF/RF	DEC/GP	RF/RF	GP/GP	RF/RF	SVR/GP	SVR/RF	DaL/GP	RF/RF	DeP/GP	-/-	-/-
JUMP3R	RF/RF	GP/GP	LR/SVR	SPL/GP	SVR/SVR	SPL/GP	SVR/SVR	LR/GP	SVR/SVR	LR/GP	DT/SVR	DeP/GP	SVR/SVR	SPL/GP	SVR/SVR	GP/GP	-/-	-/-
MARIADB	GP/RF	DeP/DeP	DT/RF	LR/DeP	DT/RF	DeP/DeP	LR/RF	DeP/DeP	HIP/RF	SPL/DeP	DT/RF	DeP/DeP	RF/RF	DeP/DeP	RF/RF	DeP/DeP	-/-	-/-
POLLY	GP/RF	DeP/LR	RF/RF	DEC/LR	HIP/RF	LR/LR	SVR/RF	LR/LR	DEC/RF	LR/LR	GP/RF	HIP/LR	GP/RF	DT/LR	SPL/RF	LR/LR	-/-	-/-
SQL	DeP/RF	DT/SPL	SVR/RF	LR/SPL	DeP/RF	LR/SPL	GP/RF	DT/SPL	DT/RF	LR/SPL	LR/RF	DT/SPL	GP/RF	DEC/SPL	LR/RF	DEC/SPL	-/-	-/-
VP9	DeP/DT	DT/SVR	RF/DT	DeP/SVR	DeP/DT	SVR/SVR	HIP/DT	SVR/SVR	HIP/DT	SVR/SVR	DaL/DT	GP/SVR	DT/DT	RF/SVR	HIP/DT	SVR/SVR	-/-	-/-
SPARK	LR/RF	GP/SVR	GP/RF	DaL/SVR	LR/RF	GP/SVR	LR/RF	DeP/SVR	DaL/RF	SVR/SVR	DEC/RF	GP/SVR	DT/RF	SPL/SVR	DaL/RF	LR/SVR	-/-	-/-
HIPACC	DeP/DT	SVR/SPL	HIP/DT	GP/SPL	RF/DT	LR/SPL	DaL/DT	SVR/SPL	RF/DT	SPL/SPL	DaL/DT	SVR/SPL	LR/DT	SVR/SPL	RF/DT	DeP/SPL	-/-	-/-
REDIS	DT/RF	DeP/DeP	GP/RF	HIP/DeP	DT/RF	SVR/DeP	HIP/RF	SVR/DeP	GP/RF	DaL/DeP	DaL/RF	DT/DeP	DEC/RF	DaL/DeP	DEC/RF	GP/DeP	-/-	-/-
STORM	DeP/DT	DT/SPL	SPL/DT	RF/SPL	LR/DT	DeP/SPL	RF/DT	DeP/SPL	DaL/DT	SPL/SPL	GP/DT	DeP/SPL	SVR/DT	LR/SPL	SPL/DT	DaL/SPL	-/-	-/-
SAC	SPL/DT	DeP/DeP	SPL/DT	SVR/DeP	DEC/DT	SVR/DeP	DaL/DT	DeP/DeP	DT/DT	LR/DeP	DT/DT	DeP/DeP	DT/DT	SVR/DeP	DEC/DT	SVR/DeP	-/-	-/-
HADOOP	DT/RF	GP/DeP	SVR/RF	LR/DeP	DEC/RF	HIP/DeP	DaL/RF	HIP/DeP	GP/RF	DeP/DeP	DEC/RF	DeP/DeP	HIP/RF	DT/DeP	DaL/RF	RF/DeP	-/-	-/-
TOMCAT	DEC/RF	SVR/SVR	SVR/RF	DeP/SVR	RF/RF	SPL/SVR	GP/RF	RF/SVR	RF/RF	SVR/SVR	DaL/RF	HIP/SVR	DEC/RF	DT/SVR	DEC/RF	SPL/SVR	-/-	-/-
JAVAGC	DeP/DT	SVR/SPL	DaL/DT	GP/SPL	HIP/DT	GP/SPL	DEC/DT	SVR/SPL	DT/DT	SVR/SPL	DaL/DT	DeP/SPL	DaL/DT	GP/SPL	RF/DT	SVR/SPL	-/-	-/-