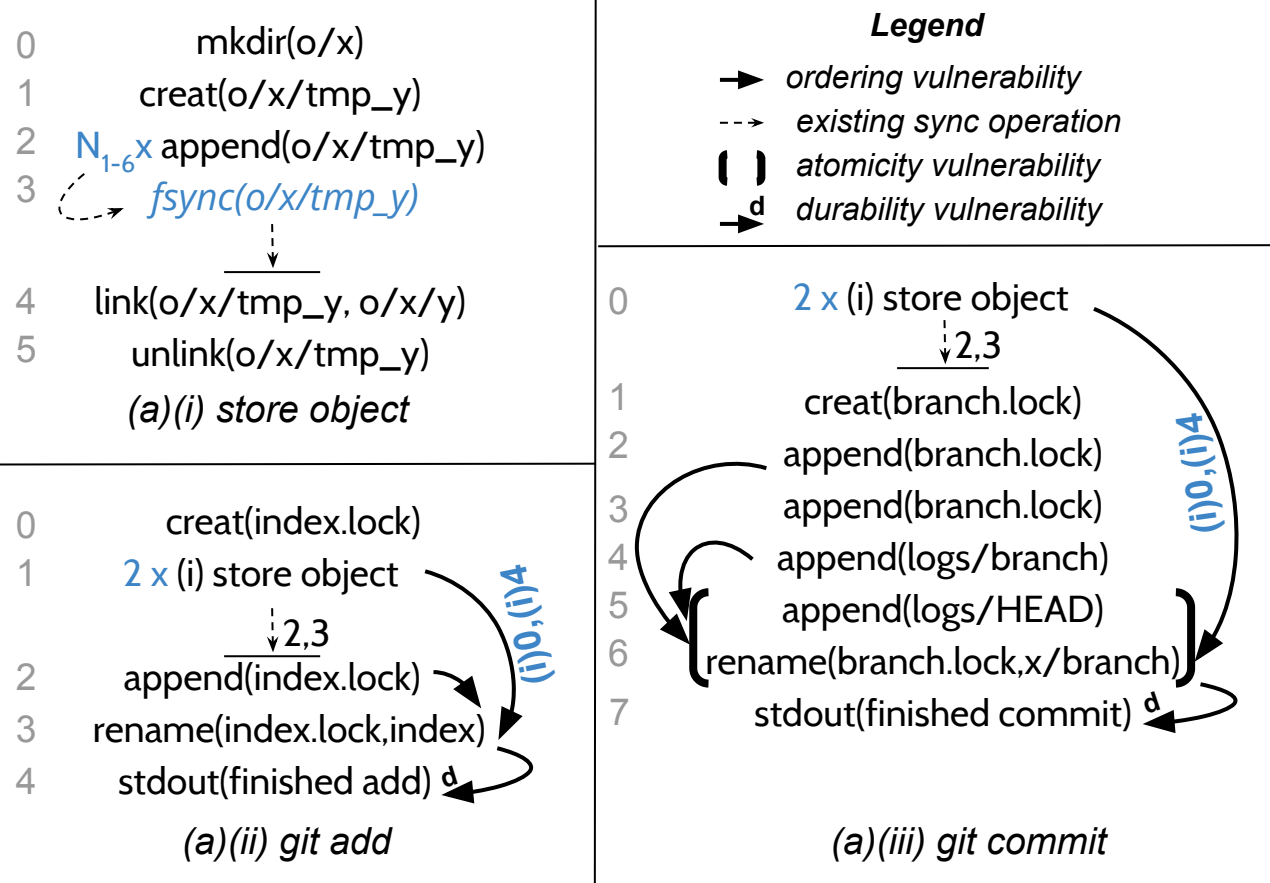
0 mkdir(o/x)
1 creat(o/x/tmp_y)
2 N1-6x append(o/x/tmp_y)
3 fsync(o/x/tmp_y)
4 link(o/x/tmp_y, o/x/y)
5 unlink(o/x/tmp_y)
(a)(i) store object
Legend
ordering vulnerability
existing sync operation
atomicity vulnerability
d durability vulnerability
0 creat(index.lock)
1 2 x (i) store object
2,3
2 append(index.lock)
3 rename(index.lock,index)
4 stdout(finished add) d
(i)0,(i)4
(a)(ii) git add
0 2 x (i) store object
2,3
1 creat(branch.lock)
2 append(branch.lock)
3 append(branch.lock)
4 append(logs/branch)
5 append(logs/HEAD)
6 rename(branch.lock,x/branch)
7 stdout(finished commit) d
(i)0,(i)4
(a)(iii) git commit