**Exercise 1:**

1. FOL:

Company(sumsum).

Company(appy).

SmartPhoneTech(galactica-s3).

Developed(galactica-s3, sumsum).

Boss(stevey).

Competitor(sumsum, appy).

Steal(stevey, galactica-s3).

∀ Tech, SmartPhoneTech(Tech) ⇒ Business(Tech)

∀ Comp, Competitor(Comp, appy) ∨ Competitor(appy, Comp) ⇒ Rival(Comp)

∀ X, Bus, Comp1, Boss(X) ∧ Steal(X, Bus) ∧ Business(Bus) ∧ Developed(Bus, Comp1) ∧ Rival(Comp1) ⇒ Unethical(X)

1. Prolog clauses:
2. company(sumsum).
3. company(appy).
4. smartPhoneTech(galactica-s3).
5. developed(galactica-s3, sumsum).
6. boss(stevey).
7. stole(stevey, galactica-s3).
8. competitor(sumsum, appy).
9. rival(Comp):- competitor(Comp, appy);competitor(appy, Comp).
10. business(Tech):-smartPhoneTech(Tech).
11. unethical(X):-boss(X),stole(X, Bus),business(Bus),developed(Bus, Comp1),rival(Comp1).
12. Trace:

?- unethical(stevey).

true .

?- trace.

true.

[trace] ?- unethical(stevey).

Call: (10) unethical(stevey) ? creep

Call: (11) boss(stevey) ? creep

Exit: (11) boss(stevey) ? creep

Call: (11) stole(stevey, \_5582) ? creep

Exit: (11) stole(stevey, galactica-s3) ? creep

Call: (11) business(galactica-s3) ? creep

Call: (12) smartPhoneTech(galactica-s3) ? creep

Exit: (12) smartPhoneTech(galactica-s3) ? creep

Exit: (11) business(galactica-s3) ? creep

Call: (11) developed(galactica-s3, \_5852) ? creep

Exit: (11) developed(galactica-s3, sumsum) ? creep

Call: (11) rival(sumsum) ? creep

Call: (12) competitor(sumsum, appy) ? creep

Exit: (12) competitor(sumsum, appy) ? creep

Exit: (11) rival(sumsum) ? creep

Exit: (10) unethical(stevey) ? creep

true .

**Exercise 2:**

**old\_royal:**

1. child(prince, charles).
2. child(princess, ann).
3. child(prince, andrew).
4. child(prince, edward).
5. older(charles, ann).
6. older(ann, andrew).
7. older(andrew, edward).
8. male(A):- child(prince, A).
9. female(A):- child(princess, A).
10. is\_older(X, Y):- older(X, Y).
11. is\_older(A, B):- older(A, X),is\_older(X, B).
12. in\_order(X, Y) :- child(prince, X), child(princess, Y).
13. in\_order(X, Y) :- child(prince, X), child(prince, Y), is\_older(X, Y).
14. in\_order(X, Y) :- child(princess, X), child(princess, Y), is\_older(X, Y).
15. insert(X, [], [X]).
16. insert(X, [Y|Z], [X, Y|Z]) :- in\_order(X, Y).
17. insert(X, [Y|Z], [Y|Z2]) :- not(in\_order(X, Y)), insert(X, Z, Z2).
18. isort([], Po, Po).
19. isort([J|Z], Po, Y) :- insert(J, Po, Po2), isort(Z, Po2, Y).
20. insert\_sort(X, Y) :- isort(X, [], Y).
21. successors(X, Y) :- insert\_sort(X, Y).
22. sList(SList):- findall(Y, child(\_,Y), ChildList), successors(ChildList, SList).

**Trace:**

**?- sList(SList).**

**SList = [charles, andrew, edward, ann]**

[trace] ?-

|

| sList(SList).

[1;32mCall: [0m(10) sList(\_37896) ?

creep

^ [1;32mCall: [0m(11) findall(\_38278, child(\_38276, \_38278), \_38338) ?

creep

[1;32mCall: [0m(16) child(\_38276, \_38278) ?

creep

[1;32mExit: [0m(16) child(prince, charles) ?

creep

[1;33mRedo: [0m(16) child(\_38276, \_38278) ?

creep

[1;32mExit: [0m(16) child(princess, ann) ?

creep

[1;33mRedo: [0m(16) child(\_38276, \_38278) ?

creep

[1;32mExit: [0m(16) child(prince, andrew) ?

creep

[1;33mRedo: [0m(16) child(\_38276, \_38278) ?

creep

[1;32mExit: [0m(16) child(prince, edward) ?

creep

^ [1;32mExit: [0m(11) findall(\_38278, user:child(\_38276, \_38278), [charles, ann, andrew, edward]) ?

creep

[1;32mCall: [0m(11) successors([charles, ann, andrew, edward], \_37896) ?

creep

[1;32mCall: [0m(12) insert\_sort([charles, ann, andrew, edward], \_37896) ?

creep

[1;32mCall: [0m(13) isort([charles, ann, andrew, edward], [], \_37896) ?

creep

[1;32mCall: [0m(14) insert(charles, [], \_38968) ?

creep

[1;32mExit: [0m(14) insert(charles, [], [charles]) ?

creep

[1;32mCall: [0m(14) isort([ann, andrew, edward], [charles], \_37896) ?

creep

[1;32mCall: [0m(15) insert(ann, [charles], \_39106) ?

creep

[1;32mCall: [0m(16) in\_order(ann, charles) ?

creep

[1;32mCall: [0m(17) child(prince, ann) ?

creep

[1;31mFail: [0m(17) child(prince, ann) ?

creep

[1;33mRedo: [0m(16) in\_order(ann, charles) ?

creep

[1;32mCall: [0m(17) child(prince, ann) ?

creep

[1;31mFail: [0m(17) child(prince, ann) ?

creep

[1;33mRedo: [0m(16) in\_order(ann, charles) ?

creep

[1;32mCall: [0m(17) child(princess, ann) ?

creep

[1;32mExit: [0m(17) child(princess, ann) ?

creep

[1;32mCall: [0m(17) child(princess, charles) ?

creep

[1;31mFail: [0m(17) child(princess, charles) ?

creep

[1;31mFail: [0m(16) in\_order(ann, charles) ?

creep

[1;33mRedo: [0m(15) insert(ann, [charles], \_39690) ?

creep

^ [1;32mCall: [0m(16) not(in\_order(ann, charles)) ?

creep

[1;32mCall: [0m(17) in\_order(ann, charles) ?

creep

[1;32mCall: [0m(18) child(prince, ann) ?

creep

[1;31mFail: [0m(18) child(prince, ann) ?

creep

[1;33mRedo: [0m(17) in\_order(ann, charles) ?

creep

[1;32mCall: [0m(18) child(prince, ann) ?

creep

[1;31mFail: [0m(18) child(prince, ann) ?

creep

[1;33mRedo: [0m(17) in\_order(ann, charles) ?

creep

[1;32mCall: [0m(18) child(princess, ann) ?

creep

[1;32mExit: [0m(18) child(princess, ann) ?

creep

[1;32mCall: [0m(18) child(princess, charles) ?

creep

[1;31mFail: [0m(18) child(princess, charles) ?

creep

[1;31mFail: [0m(17) in\_order(ann, charles) ?

creep

^ [1;32mExit: [0m(16) not(user:in\_order(ann, charles)) ?

creep

[1;32mCall: [0m(16) insert(ann, [], \_39680) ?

creep

[1;32mExit: [0m(16) insert(ann, [], [ann]) ?

creep

[1;32mExit: [0m(15) insert(ann, [charles], [charles, ann]) ?

creep

[1;32mCall: [0m(15) isort([andrew, edward], [charles, ann], \_37896) ?

creep

[1;32mCall: [0m(16) insert(andrew, [charles, ann], \_40550) ?

creep

[1;32mCall: [0m(17) in\_order(andrew, charles) ?

creep

[1;32mCall: [0m(18) child(prince, andrew) ?

creep

[1;32mExit: [0m(18) child(prince, andrew) ?

creep

[1;32mCall: [0m(18) child(princess, charles) ?

creep

[1;31mFail: [0m(18) child(princess, charles) ?

creep

[1;33mRedo: [0m(17) in\_order(andrew, charles) ?

creep

[1;32mCall: [0m(18) child(prince, andrew) ?

creep

[1;32mExit: [0m(18) child(prince, andrew) ?

creep

[1;32mCall: [0m(18) child(prince, charles) ?

creep

[1;32mExit: [0m(18) child(prince, charles) ?

creep

[1;32mCall: [0m(18) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(19) older(andrew, charles) ?

creep

[1;31mFail: [0m(19) older(andrew, charles) ?

creep

[1;33mRedo: [0m(18) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(19) older(andrew, \_41220) ?

creep

[1;32mExit: [0m(19) older(andrew, edward) ?

creep

[1;32mCall: [0m(19) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(20) older(edward, charles) ?

creep

[1;31mFail: [0m(20) older(edward, charles) ?

creep

[1;33mRedo: [0m(19) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(20) older(edward, \_41484) ?

creep

[1;31mFail: [0m(20) older(edward, \_41528) ?

creep

[1;31mFail: [0m(19) is\_older(edward, charles) ?

creep

[1;31mFail: [0m(18) is\_older(andrew, charles) ?

creep

[1;33mRedo: [0m(17) in\_order(andrew, charles) ?

creep

[1;32mCall: [0m(18) child(princess, andrew) ?

creep

[1;31mFail: [0m(18) child(princess, andrew) ?

creep

[1;31mFail: [0m(17) in\_order(andrew, charles) ?

creep

[1;33mRedo: [0m(16) insert(andrew, [charles, ann], \_41838) ?

creep

^ [1;32mCall: [0m(17) not(in\_order(andrew, charles)) ?

creep

[1;32mCall: [0m(18) in\_order(andrew, charles) ?

creep

[1;32mCall: [0m(19) child(prince, andrew) ?

creep

[1;32mExit: [0m(19) child(prince, andrew) ?

creep

[1;32mCall: [0m(19) child(princess, charles) ?

creep

[1;31mFail: [0m(19) child(princess, charles) ?

creep

[1;33mRedo: [0m(18) in\_order(andrew, charles) ?

creep

[1;32mCall: [0m(19) child(prince, andrew) ?

creep

[1;32mExit: [0m(19) child(prince, andrew) ?

creep

[1;32mCall: [0m(19) child(prince, charles) ?

creep

[1;32mExit: [0m(19) child(prince, charles) ?

creep

[1;32mCall: [0m(19) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(20) older(andrew, charles) ?

creep

[1;31mFail: [0m(20) older(andrew, charles) ?

creep

[1;33mRedo: [0m(19) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(20) older(andrew, \_42558) ?

creep

[1;32mExit: [0m(20) older(andrew, edward) ?

creep

[1;32mCall: [0m(20) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(21) older(edward, charles) ?

creep

[1;31mFail: [0m(21) older(edward, charles) ?

creep

[1;33mRedo: [0m(20) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(21) older(edward, \_42822) ?

creep

[1;31mFail: [0m(21) older(edward, \_42866) ?

creep

[1;31mFail: [0m(20) is\_older(edward, charles) ?

creep

[1;31mFail: [0m(19) is\_older(andrew, charles) ?

creep

[1;33mRedo: [0m(18) in\_order(andrew, charles) ?

creep

[1;32mCall: [0m(19) child(princess, andrew) ?

creep

[1;31mFail: [0m(19) child(princess, andrew) ?

creep

[1;31mFail: [0m(18) in\_order(andrew, charles) ?

creep

^ [1;32mExit: [0m(17) not(user:in\_order(andrew, charles)) ?

creep

[1;32mCall: [0m(17) insert(andrew, [ann], \_41828) ?

creep

[1;32mCall: [0m(18) in\_order(andrew, ann) ?

creep

[1;32mCall: [0m(19) child(prince, andrew) ?

creep

[1;32mExit: [0m(19) child(prince, andrew) ?

creep

[1;32mCall: [0m(19) child(princess, ann) ?

creep

[1;32mExit: [0m(19) child(princess, ann) ?

creep

[1;32mExit: [0m(18) in\_order(andrew, ann) ?

creep

[1;32mExit: [0m(17) insert(andrew, [ann], [andrew, ann]) ?

creep

[1;32mExit: [0m(16) insert(andrew, [charles, ann], [charles, andrew, ann]) ?

creep

[1;32mCall: [0m(16) isort([edward], [charles, andrew, ann], \_37896) ?

creep

[1;32mCall: [0m(17) insert(edward, [charles, andrew, ann], \_43672) ?

creep

[1;32mCall: [0m(18) in\_order(edward, charles) ?

creep

[1;32mCall: [0m(19) child(prince, edward) ?

creep

[1;32mExit: [0m(19) child(prince, edward) ?

creep

[1;32mCall: [0m(19) child(princess, charles) ?

creep

[1;31mFail: [0m(19) child(princess, charles) ?

creep

[1;33mRedo: [0m(18) in\_order(edward, charles) ?

creep

[1;32mCall: [0m(19) child(prince, edward) ?

creep

[1;32mExit: [0m(19) child(prince, edward) ?

creep

[1;32mCall: [0m(19) child(prince, charles) ?

creep

[1;32mExit: [0m(19) child(prince, charles) ?

creep

[1;32mCall: [0m(19) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(20) older(edward, charles) ?

creep

[1;31mFail: [0m(20) older(edward, charles) ?

creep

[1;33mRedo: [0m(19) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(20) older(edward, \_44342) ?

creep

[1;31mFail: [0m(20) older(edward, \_44386) ?

creep

[1;31mFail: [0m(19) is\_older(edward, charles) ?

creep

[1;33mRedo: [0m(18) in\_order(edward, charles) ?

creep

[1;32mCall: [0m(19) child(princess, edward) ?

creep

[1;31mFail: [0m(19) child(princess, edward) ?

creep

[1;31mFail: [0m(18) in\_order(edward, charles) ?

creep

[1;33mRedo: [0m(17) insert(edward, [charles, andrew, ann], \_44652) ?

creep

^ [1;32mCall: [0m(18) not(in\_order(edward, charles)) ?

creep

[1;32mCall: [0m(19) in\_order(edward, charles) ?

creep

[1;32mCall: [0m(20) child(prince, edward) ?

creep

[1;32mExit: [0m(20) child(prince, edward) ?

creep

[1;32mCall: [0m(20) child(princess, charles) ?

creep

[1;31mFail: [0m(20) child(princess, charles) ?

creep

[1;33mRedo: [0m(19) in\_order(edward, charles) ?

creep

[1;32mCall: [0m(20) child(prince, edward) ?

creep

[1;32mExit: [0m(20) child(prince, edward) ?

creep

[1;32mCall: [0m(20) child(prince, charles) ?

creep

[1;32mExit: [0m(20) child(prince, charles) ?

creep

[1;32mCall: [0m(20) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(21) older(edward, charles) ?

creep

[1;31mFail: [0m(21) older(edward, charles) ?

creep

[1;33mRedo: [0m(20) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(21) older(edward, \_45372) ?

creep

[1;31mFail: [0m(21) older(edward, \_45416) ?

creep

[1;31mFail: [0m(20) is\_older(edward, charles) ?

creep

[1;33mRedo: [0m(19) in\_order(edward, charles) ?

creep

[1;32mCall: [0m(20) child(princess, edward) ?

creep

[1;31mFail: [0m(20) child(princess, edward) ?

creep

[1;31mFail: [0m(19) in\_order(edward, charles) ?

creep

^ [1;32mExit: [0m(18) not(user:in\_order(edward, charles)) ?

creep

[1;32mCall: [0m(18) insert(edward, [andrew, ann], \_44642) ?

creep

[1;32mCall: [0m(19) in\_order(edward, andrew) ?

creep

[1;32mCall: [0m(20) child(prince, edward) ?

creep

[1;32mExit: [0m(20) child(prince, edward) ?

creep

[1;32mCall: [0m(20) child(princess, andrew) ?

creep

[1;31mFail: [0m(20) child(princess, andrew) ?

creep

[1;33mRedo: [0m(19) in\_order(edward, andrew) ?

creep

[1;32mCall: [0m(20) child(prince, edward) ?

creep

[1;32mExit: [0m(20) child(prince, edward) ?

creep

[1;32mCall: [0m(20) child(prince, andrew) ?

creep

[1;32mExit: [0m(20) child(prince, andrew) ?

creep

[1;32mCall: [0m(20) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(21) older(edward, andrew) ?

creep

[1;31mFail: [0m(21) older(edward, andrew) ?

creep

[1;33mRedo: [0m(20) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(21) older(edward, \_46396) ?

creep

[1;31mFail: [0m(21) older(edward, \_46440) ?

creep

[1;31mFail: [0m(20) is\_older(edward, andrew) ?

creep

[1;33mRedo: [0m(19) in\_order(edward, andrew) ?

creep

[1;32mCall: [0m(20) child(princess, edward) ?

creep

[1;31mFail: [0m(20) child(princess, edward) ?

creep

[1;31mFail: [0m(19) in\_order(edward, andrew) ?

creep

[1;33mRedo: [0m(18) insert(edward, [andrew, ann], \_44642) ?

creep

^ [1;32mCall: [0m(19) not(in\_order(edward, andrew)) ?

creep

[1;32mCall: [0m(20) in\_order(edward, andrew) ?

creep

[1;32mCall: [0m(21) child(prince, edward) ?

creep

[1;32mExit: [0m(21) child(prince, edward) ?

creep

[1;32mCall: [0m(21) child(princess, andrew) ?

creep

[1;31mFail: [0m(21) child(princess, andrew) ?

creep

[1;33mRedo: [0m(20) in\_order(edward, andrew) ?

creep

[1;32mCall: [0m(21) child(prince, edward) ?

creep

[1;32mExit: [0m(21) child(prince, edward) ?

creep

[1;32mCall: [0m(21) child(prince, andrew) ?

creep

[1;32mExit: [0m(21) child(prince, andrew) ?

creep

[1;32mCall: [0m(21) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(22) older(edward, andrew) ?

creep

[1;31mFail: [0m(22) older(edward, andrew) ?

creep

[1;33mRedo: [0m(21) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(22) older(edward, \_47426) ?

creep

[1;31mFail: [0m(22) older(edward, \_47470) ?

creep

[1;31mFail: [0m(21) is\_older(edward, andrew) ?

creep

[1;33mRedo: [0m(20) in\_order(edward, andrew) ?

creep

[1;32mCall: [0m(21) child(princess, edward) ?

creep

[1;31mFail: [0m(21) child(princess, edward) ?

creep

[1;31mFail: [0m(20) in\_order(edward, andrew) ?

creep

^ [1;32mExit: [0m(19) not(user:in\_order(edward, andrew)) ?

creep

[1;32mCall: [0m(19) insert(edward, [ann], \_46696) ?

creep

[1;32mCall: [0m(20) in\_order(edward, ann) ?

creep

[1;32mCall: [0m(21) child(prince, edward) ?

creep

[1;32mExit: [0m(21) child(prince, edward) ?

creep

[1;32mCall: [0m(21) child(princess, ann) ?

creep

[1;32mExit: [0m(21) child(princess, ann) ?

creep

[1;32mExit: [0m(20) in\_order(edward, ann) ?

creep

[1;32mExit: [0m(19) insert(edward, [ann], [edward, ann]) ?

creep

[1;32mExit: [0m(18) insert(edward, [andrew, ann], [andrew, edward, ann]) ?

creep

[1;32mExit: [0m(17) insert(edward, [charles, andrew, ann], [charles, andrew, edward, ann]) ?

creep

[1;32mCall: [0m(17) isort([], [charles, andrew, edward, ann], \_37896) ?

creep

[1;32mExit: [0m(17) isort([], [charles, andrew, edward, ann], [charles, andrew, edward, ann]) ?

creep

[1;32mExit: [0m(16) isort([edward], [charles, andrew, ann], [charles, andrew, edward, ann]) ?

creep

[1;32mExit: [0m(15) isort([andrew, edward], [charles, ann], [charles, andrew, edward, ann]) ?

creep

[1;32mExit: [0m(14) isort([ann, andrew, edward], [charles], [charles, andrew, edward, ann]) ?

creep

[1;32mExit: [0m(13) isort([charles, ann, andrew, edward], [], [charles, andrew, edward, ann]) ?

creep

[1;32mExit: [0m(12) insert\_sort([charles, ann, andrew, edward], [charles, andrew, edward, ann]) ?

creep

[1;32mExit: [0m(11) successors([charles, ann, andrew, edward], [charles, andrew, edward, ann]) ?

creep

[1;32mExit: [0m(10) sList([charles, andrew, edward, ann]) ?

creep

**SList = [charles, andrew, edward, ann]**

**new\_royal:**

Implement new FOL:

“in\_order” goal used to determine the order is removed. “insert” goal, premise “in\_order” replaced by “is\_older”.

1. child(prince, charles).
2. child(princess, ann).
3. child(prince, andrew).
4. child(prince, edward).
5. older(charles, ann).
6. older(ann, andrew).
7. older(andrew, edward).
8. male(A):- child(prince, A).
9. female(A):- child(princess, A).
10. is\_older(X, Y):- older(X, Y).
11. is\_older(A, B):- older(A, X), is\_older(X, B).
12. insert(X, [], [X]).
13. insert(X, [Y|Z], [X, Y|Z]) :- is\_older(X, Y).
14. insert(X, [Y|Z], [Y|Z2]) :- not(is\_older(X, Y)), insert(X, Z, Z2).
15. isort(X, Y) :- isort2(X, [], Y).
16. isort2([], Po, Po).
17. isort2([J|Z], Po, Y) :- insert(J, Po, Po2), isort2(Z, Po2, Y).
18. sList(SList):-findall(Y, child(\_,Y), ChildList), isort(ChildList, SList).

**Trace:**

**?- sList(SList).**

**SList = [charles, ann, andrew, edward]**

[trace] ?- sList(SList).

[1;32mCall: [0m(10) sList(\_2996) ?

creep

^ [1;32mCall: [0m(11) findall(\_3378, child(\_3376, \_3378), \_3438) ?

creep

[1;32mCall: [0m(16) child(\_3376, \_3378) ?

creep

[1;32mExit: [0m(16) child(prince, charles) ?

creep

[1;33mRedo: [0m(16) child(\_3376, \_3378) ?

creep

[1;32mExit: [0m(16) child(princess, ann) ?

creep

[1;33mRedo: [0m(16) child(\_3376, \_3378) ?

creep

[1;32mExit: [0m(16) child(prince, andrew) ?

creep

[1;33mRedo: [0m(16) child(\_3376, \_3378) ?

creep

[1;32mExit: [0m(16) child(prince, edward) ?

creep

^ [1;32mExit: [0m(11) findall(\_3378, user:child(\_3376, \_3378), [charles, ann, andrew, edward]) ?

creep

[1;32mCall: [0m(11) isort([charles, ann, andrew, edward], \_2996) ?

creep

[1;32mCall: [0m(12) isort2([charles, ann, andrew, edward], [], \_2996) ?

creep

[1;32mCall: [0m(13) insert(charles, [], \_4024) ?

creep

[1;32mExit: [0m(13) insert(charles, [], [charles]) ?

creep

[1;32mCall: [0m(13) isort2([ann, andrew, edward], [charles], \_2996) ?

creep

[1;32mCall: [0m(14) insert(ann, [charles], \_4162) ?

creep

[1;32mCall: [0m(15) is\_older(ann, charles) ?

creep

[1;32mCall: [0m(16) older(ann, charles) ?

creep

[1;31mFail: [0m(16) older(ann, charles) ?

creep

[1;33mRedo: [0m(15) is\_older(ann, charles) ?

creep

[1;32mCall: [0m(16) older(ann, \_4392) ?

creep

[1;32mExit: [0m(16) older(ann, andrew) ?

creep

[1;32mCall: [0m(16) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(17) older(andrew, charles) ?

creep

[1;31mFail: [0m(17) older(andrew, charles) ?

creep

[1;33mRedo: [0m(16) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(17) older(andrew, \_4656) ?

creep

[1;32mExit: [0m(17) older(andrew, edward) ?

creep

[1;32mCall: [0m(17) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(18) older(edward, charles) ?

creep

[1;31mFail: [0m(18) older(edward, charles) ?

creep

[1;33mRedo: [0m(17) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(18) older(edward, \_4920) ?

creep

[1;31mFail: [0m(18) older(edward, \_4964) ?

creep

[1;31mFail: [0m(17) is\_older(edward, charles) ?

creep

[1;31mFail: [0m(16) is\_older(andrew, charles) ?

creep

[1;31mFail: [0m(15) is\_older(ann, charles) ?

creep

[1;33mRedo: [0m(14) insert(ann, [charles], \_5142) ?

creep

^ [1;32mCall: [0m(15) not(is\_older(ann, charles)) ?

creep

[1;32mCall: [0m(16) is\_older(ann, charles) ?

creep

[1;32mCall: [0m(17) older(ann, charles) ?

creep

[1;31mFail: [0m(17) older(ann, charles) ?

creep

[1;33mRedo: [0m(16) is\_older(ann, charles) ?

creep

[1;32mCall: [0m(17) older(ann, \_5422) ?

creep

[1;32mExit: [0m(17) older(ann, andrew) ?

creep

[1;32mCall: [0m(17) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(18) older(andrew, charles) ?

creep

[1;31mFail: [0m(18) older(andrew, charles) ?

creep

[1;33mRedo: [0m(17) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(18) older(andrew, \_5686) ?

creep

[1;32mExit: [0m(18) older(andrew, edward) ?

creep

[1;32mCall: [0m(18) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(19) older(edward, charles) ?

creep

[1;31mFail: [0m(19) older(edward, charles) ?

creep

[1;33mRedo: [0m(18) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(19) older(edward, \_5950) ?

creep

[1;31mFail: [0m(19) older(edward, \_5994) ?

creep

[1;31mFail: [0m(18) is\_older(edward, charles) ?

creep

[1;31mFail: [0m(17) is\_older(andrew, charles) ?

creep

[1;31mFail: [0m(16) is\_older(ann, charles) ?

creep

^ [1;32mExit: [0m(15) not(user:is\_older(ann, charles)) ?

creep

[1;32mCall: [0m(15) insert(ann, [], \_5132) ?

creep

[1;32mExit: [0m(15) insert(ann, [], [ann]) ?

creep

[1;32mExit: [0m(14) insert(ann, [charles], [charles, ann]) ?

creep

[1;32mCall: [0m(14) isort2([andrew, edward], [charles, ann], \_2996) ?

creep

[1;32mCall: [0m(15) insert(andrew, [charles, ann], \_6398) ?

creep

[1;32mCall: [0m(16) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(17) older(andrew, charles) ?

creep

[1;31mFail: [0m(17) older(andrew, charles) ?

creep

[1;33mRedo: [0m(16) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(17) older(andrew, \_6628) ?

creep

[1;32mExit: [0m(17) older(andrew, edward) ?

creep

[1;32mCall: [0m(17) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(18) older(edward, charles) ?

creep

[1;31mFail: [0m(18) older(edward, charles) ?

creep

[1;33mRedo: [0m(17) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(18) older(edward, \_6892) ?

creep

[1;31mFail: [0m(18) older(edward, \_6936) ?

creep

[1;31mFail: [0m(17) is\_older(edward, charles) ?

creep

[1;31mFail: [0m(16) is\_older(andrew, charles) ?

creep

[1;33mRedo: [0m(15) insert(andrew, [charles, ann], \_7070) ?

creep

^ [1;32mCall: [0m(16) not(is\_older(andrew, charles)) ?

creep

[1;32mCall: [0m(17) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(18) older(andrew, charles) ?

creep

[1;31mFail: [0m(18) older(andrew, charles) ?

creep

[1;33mRedo: [0m(17) is\_older(andrew, charles) ?

creep

[1;32mCall: [0m(18) older(andrew, \_7350) ?

creep

[1;32mExit: [0m(18) older(andrew, edward) ?

creep

[1;32mCall: [0m(18) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(19) older(edward, charles) ?

creep

[1;31mFail: [0m(19) older(edward, charles) ?

creep

[1;33mRedo: [0m(18) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(19) older(edward, \_7614) ?

creep

[1;31mFail: [0m(19) older(edward, \_7658) ?

creep

[1;31mFail: [0m(18) is\_older(edward, charles) ?

creep

[1;31mFail: [0m(17) is\_older(andrew, charles) ?

creep

^ [1;32mExit: [0m(16) not(user:is\_older(andrew, charles)) ?

creep

[1;32mCall: [0m(16) insert(andrew, [ann], \_7060) ?

creep

[1;32mCall: [0m(17) is\_older(andrew, ann) ?

creep

[1;32mCall: [0m(18) older(andrew, ann) ?

creep

[1;31mFail: [0m(18) older(andrew, ann) ?

creep

[1;33mRedo: [0m(17) is\_older(andrew, ann) ?

creep

[1;32mCall: [0m(18) older(andrew, \_8066) ?

creep

[1;32mExit: [0m(18) older(andrew, edward) ?

creep

[1;32mCall: [0m(18) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(19) older(edward, ann) ?

creep

[1;31mFail: [0m(19) older(edward, ann) ?

creep

[1;33mRedo: [0m(18) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(19) older(edward, \_8330) ?

creep

[1;31mFail: [0m(19) older(edward, \_8374) ?

creep

[1;31mFail: [0m(18) is\_older(edward, ann) ?

creep

[1;31mFail: [0m(17) is\_older(andrew, ann) ?

creep

[1;33mRedo: [0m(16) insert(andrew, [ann], \_7060) ?

creep

^ [1;32mCall: [0m(17) not(is\_older(andrew, ann)) ?

creep

[1;32mCall: [0m(18) is\_older(andrew, ann) ?

creep

[1;32mCall: [0m(19) older(andrew, ann) ?

creep

[1;31mFail: [0m(19) older(andrew, ann) ?

creep

[1;33mRedo: [0m(18) is\_older(andrew, ann) ?

creep

[1;32mCall: [0m(19) older(andrew, \_8788) ?

creep

[1;32mExit: [0m(19) older(andrew, edward) ?

creep

[1;32mCall: [0m(19) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(20) older(edward, ann) ?

creep

[1;31mFail: [0m(20) older(edward, ann) ?

creep

[1;33mRedo: [0m(19) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(20) older(edward, \_9052) ?

creep

[1;31mFail: [0m(20) older(edward, \_9096) ?

creep

[1;31mFail: [0m(19) is\_older(edward, ann) ?

creep

[1;31mFail: [0m(18) is\_older(andrew, ann) ?

creep

^ [1;32mExit: [0m(17) not(user:is\_older(andrew, ann)) ?

creep

[1;32mCall: [0m(17) insert(andrew, [], \_8498) ?

creep

[1;32mExit: [0m(17) insert(andrew, [], [andrew]) ?

creep

[1;32mExit: [0m(16) insert(andrew, [ann], [ann, andrew]) ?

creep

[1;32mExit: [0m(15) insert(andrew, [charles, ann], [charles, ann, andrew]) ?

creep

[1;32mCall: [0m(15) isort2([edward], [charles, ann, andrew], \_2996) ?

creep

[1;32mCall: [0m(16) insert(edward, [charles, ann, andrew], \_9500) ?

creep

[1;32mCall: [0m(17) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(18) older(edward, charles) ?

creep

[1;31mFail: [0m(18) older(edward, charles) ?

creep

[1;33mRedo: [0m(17) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(18) older(edward, \_9730) ?

creep

[1;31mFail: [0m(18) older(edward, \_9774) ?

creep

[1;31mFail: [0m(17) is\_older(edward, charles) ?

creep

[1;33mRedo: [0m(16) insert(edward, [charles, ann, andrew], \_9864) ?

creep

^ [1;32mCall: [0m(17) not(is\_older(edward, charles)) ?

creep

[1;32mCall: [0m(18) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(19) older(edward, charles) ?

creep

[1;31mFail: [0m(19) older(edward, charles) ?

creep

[1;33mRedo: [0m(18) is\_older(edward, charles) ?

creep

[1;32mCall: [0m(19) older(edward, \_10144) ?

creep

[1;31mFail: [0m(19) older(edward, \_10188) ?

creep

[1;31mFail: [0m(18) is\_older(edward, charles) ?

creep

^ [1;32mExit: [0m(17) not(user:is\_older(edward, charles)) ?

creep

[1;32mCall: [0m(17) insert(edward, [ann, andrew], \_9854) ?

creep

[1;32mCall: [0m(18) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(19) older(edward, ann) ?

creep

[1;31mFail: [0m(19) older(edward, ann) ?

creep

[1;33mRedo: [0m(18) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(19) older(edward, \_10552) ?

creep

[1;31mFail: [0m(19) older(edward, \_10596) ?

creep

[1;31mFail: [0m(18) is\_older(edward, ann) ?

creep

[1;33mRedo: [0m(17) insert(edward, [ann, andrew], \_9854) ?

creep

^ [1;32mCall: [0m(18) not(is\_older(edward, ann)) ?

creep

[1;32mCall: [0m(19) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(20) older(edward, ann) ?

creep

[1;31mFail: [0m(20) older(edward, ann) ?

creep

[1;33mRedo: [0m(19) is\_older(edward, ann) ?

creep

[1;32mCall: [0m(20) older(edward, \_10966) ?

creep

[1;31mFail: [0m(20) older(edward, \_11010) ?

creep

[1;31mFail: [0m(19) is\_older(edward, ann) ?

creep

^ [1;32mExit: [0m(18) not(user:is\_older(edward, ann)) ?

creep

[1;32mCall: [0m(18) insert(edward, [andrew], \_10676) ?

creep

[1;32mCall: [0m(19) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(20) older(edward, andrew) ?

creep

[1;31mFail: [0m(20) older(edward, andrew) ?

creep

[1;33mRedo: [0m(19) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(20) older(edward, \_11374) ?

creep

[1;31mFail: [0m(20) older(edward, \_11418) ?

creep

[1;31mFail: [0m(19) is\_older(edward, andrew) ?

creep

[1;33mRedo: [0m(18) insert(edward, [andrew], \_10676) ?

creep

^ [1;32mCall: [0m(19) not(is\_older(edward, andrew)) ?

creep

[1;32mCall: [0m(20) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(21) older(edward, andrew) ?

creep

[1;31mFail: [0m(21) older(edward, andrew) ?

creep

[1;33mRedo: [0m(20) is\_older(edward, andrew) ?

creep

[1;32mCall: [0m(21) older(edward, \_11788) ?

creep

[1;31mFail: [0m(21) older(edward, \_11832) ?

creep

[1;31mFail: [0m(20) is\_older(edward, andrew) ?

creep

^ [1;32mExit: [0m(19) not(user:is\_older(edward, andrew)) ?

creep

[1;32mCall: [0m(19) insert(edward, [], \_11498) ?

creep

[1;32mExit: [0m(19) insert(edward, [], [edward]) ?

creep

[1;32mExit: [0m(18) insert(edward, [andrew], [andrew, edward]) ?

creep

[1;32mExit: [0m(17) insert(edward, [ann, andrew], [ann, andrew, edward]) ?

creep

[1;32mExit: [0m(16) insert(edward, [charles, ann, andrew], [charles, ann, andrew, edward]) ?

creep

[1;32mCall: [0m(16) isort2([], [charles, ann, andrew, edward], \_2996) ?

creep

[1;32mExit: [0m(16) isort2([], [charles, ann, andrew, edward], [charles, ann, andrew, edward]) ?

creep

[1;32mExit: [0m(15) isort2([edward], [charles, ann, andrew], [charles, ann, andrew, edward]) ?

creep

[1;32mExit: [0m(14) isort2([andrew, edward], [charles, ann], [charles, ann, andrew, edward]) ?

creep

[1;32mExit: [0m(13) isort2([ann, andrew, edward], [charles], [charles, ann, andrew, edward]) ?

creep

[1;32mExit: [0m(12) isort2([charles, ann, andrew, edward], [], [charles, ann, andrew, edward]) ?

creep

[1;32mExit: [0m(11) isort([charles, ann, andrew, edward], [charles, ann, andrew, edward]) ?

creep

[1;32mExit: [0m(10) sList([charles, ann, andrew, edward]) ?

creep

**SList = [charles, ann, andrew, edward]**