**public** **static** Cons solve(Cons e, String v) {

Cons inverse = *list* (*list*("+", "-"), *list*("-" , "+"), *list*("\*","/"), *list*("/", "\*"), *list*("sqrt", "expt"),

*list*("expt","sqrt"), *list*("exp","log"), *list*("log","exp"));

Cons result;

System.*out*.println("\n\n\nwe are in solve with e:: " + e.toString() + " and v:: " + v);

**if** (*lhs*((Cons)e).equals(v) && *op*((Cons)e).equals("="))

{

//System.out.println("v is at the lhs");

//System.out.println("v is " + v + " and rhs is " + rhs((Cons)e));

result = e;

//System.out.println("result is " + result.toString());

}

**else** **if** (*rhs*((Cons)e) != **null** && *rhs*((Cons)e).equals(v) && *op*((Cons)e).equals("="))

{

//System.out.println("v is at the rhs");

//System.out.println("v is " + v + " and lhs is " + lhs((Cons)e));

result = *list*(*op*((Cons)e), v, *lhs*((Cons)e));

//System.out.println("result is " + result.toString());

}

**else** **if** (*consp*(*rhs*((Cons)e)) && !*consp*(*lhs*((Cons)e)))

{

**if** (*rhs*((Cons)*rhs*((Cons)e)) != **null**)

{

//System.out.println("v is hidden in rhs");

//System.out.println("v is " + v + " and rhs is " + rhs((Cons)e));

Object ope = *op*((Cons)e);

//System.out.println("ope is " + ope.toString());

Object lhse = *lhs*((Cons)e);

//System.out.println("lhse is " + lhse.toString());

Object rhse = *rhs*((Cons)e);

//System.out.println("rhse is " + rhse.toString());

String invSign = (String)*lhs*(*assoc*(*op*((Cons)e), inverse));

result = *list* (*solve*((Cons)*rhs*((Cons)e),v),invSign, *lhs*((Cons)e));

}

**else**

{

String invSign = (String)*lhs*(*assoc*(*op*((Cons)e), inverse));

result = *list* (invSign, *lhs*((Cons)e),*rhs*((Cons)e));

}

}

**else** **if** (*consp*(*rhs*((Cons)e)) && *consp*(*lhs*((Cons)e)))

{

**if** (*rhs*((Cons)*rhs*((Cons)e)) == **null** && *rhs*((Cons)*lhs*((Cons)e)) == **null**)

{

String invSign = (String)*lhs*(*assoc*(*op*((Cons)e), inverse));

result = *list*(invSign, *rhs*((Cons)*lhs*((Cons)e)), *rhs*((Cons)*rhs*((Cons)e)));

}

**else** **if** (*rhs*((Cons)*rhs*((Cons)e)) == **null** && *rhs*((Cons)*lhs*((Cons)e)) != **null**)

{

String invSign = (String)*lhs*(*assoc*(*op*((Cons)e), inverse));

result = *list* ( *solve*((Cons)*lhs*((Cons)e),v), invSign, *rhs*((Cons)*rhs*((Cons)e)));

}

**else** **if** (*rhs*((Cons)*rhs*((Cons)e)) != **null** && *rhs*((Cons)*lhs*((Cons)e)) == **null**)

{

String invSign = (String)*lhs*(*assoc*(*op*((Cons)e), inverse));

result = *list* (*solve*((Cons)*rhs*((Cons)e),v), invSign, *rhs*((Cons)*lhs*((Cons)e)));

}

**else**

result = **null**;

}

**else**

result = **null**;

**return** result;

}