Hofs Theory

COMP105 Fall 2015

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Problem M

Using calculational proof, prove that:
(o ((curry map) f) ((curry map) g)) == ((curry map) (o f g))
Given:

```
((o f g) x) == (f (g x))              ; apply-compose law
(((curry f) x) y) == (f x y)          ; apply-curried law
```

If they are equal they will return the same thing when called on a list ys.

Proof

((o ((curry map) f) ((curry map) g)) ys)

`= {apply-compose law}`

((((curry map) f) (((curry map) g) ys)))

`= {apply-curried law}`

(map f ((curry map) g) ys)

`= {apply-curried law}`

(map f (map g ys))

`= {apply-compose law}`

(map (o f g) ys)

`= {apply-curried law}`

(((curry map) (o f g)) ys)

Conclusion

This is the same as the right side when called on ys so:
(o ((curry map) f) ((curry map) g)) == ((curry map) (o f g))