# Part 3, Find the root

## a: Route:

How far will Anna and Elsa get along in 30 min?

* Anna: 51.1 km
* Elsa: 37.0 km

## b: Range:

How far would Anna and Elsa get on their respective routes with a battery charge of C = 10, 000 Wh?

* Anna: 52.7 km
* Elsa: 65.0 km

## Code a:

def distance(T, route,n=10\*\*7):

strecke = load\_route(route)[0]

def \_distance(T,min,max):

ttt = time\_to\_destination(min+(max -min)/2, route, n)

if 0<=T-ttt<=10\*\*(-10):

print("Timediff:",T - ttt)

return (min+(max -min)/2)

elif ttt < T:

return \_distance(T,min+(max -min)/2,max)

else:

return \_distance(T,min,max-(max -min)/2 )

if time\_to\_destination(max(strecke), route, 1000)<T:

print("Stop",time\_to\_destination(max(strecke), route, n))

return max(strecke)

else:

return \_distance(T,0 , max(strecke))

## Code b:

def reach(C, route, n = 10\*\*7):

strecke = load\_route(route)[0]

def \_reach(x):

leakage=total\_consumption(x, route, n)

if 0<leakage-C< 10\*\*(-10):

print("Succes:",leakage)

return x

else:

return \_reach(x-(leakage-C)/consumption(velocity(x, route)))

if total\_consumption(max(strecke),route,n)<C:

print("Stop",total\_consumption(max(strecke), route, n))

return max(strecke)

else:

return \_reach(0)