Localization with 2 beacons and wall distance

B2

y2

y1

x

a22

a1

B1

R

Assume robot coordinates are (x,y). Assume y1 is known from Ultrasonic sensor.

Assume beacon B1  is at the origin and B2 is at (0,Y) We need to calculate x from the measured angle *c* between the two beacons.

y2  = Y - y1

1. tan(a1) = y1 / x
2. tan(a2) = y2  /x
3. measure angle *c* = a1 + a2.
4. Use trigonometric identity: 
5. Substitute 1 and 2 in 4, do some algebra and solve for x
6. Which root of the quadratic should you use?
7. What values of the inputs might cause trouble? and what should your algorithm do in this case?