Restated Problem: The goal of this program is to see where the ball lands after it's hit by the player. The ball can either land in the park, be a homerun, or be completely knocked out of the park.

Inputs -> Initial horizontal velocity, impact angle, ball contact height

Outputs-> Distance traveled, airtime, max height, and where the ball lands

In order to get outputs, the inputs are run through a series of given formulas.

Variables:

double gravity

int distanceOfFence

int distanceOfEdge

double initialHorizontalVelocity

double impactAngle

double contactHeight

bool verifiedInput

double verticalVelocity

double timeToFence

double timeToEdge

double ballHeightAtFence

double ballHeightAtEdge

double maxBallHeight

double ballTravelTime

double distanceBallTraveled

int result

Functions: getInput

➔ Collects Initial horizontal velocity, impact angle, ball contact height from a user. Must return all inputs in a way to the other functions can use them

fenceTime

➔ NEEDS: Initial horizontal velocity
➔ Calculates the time it takes the ball to reach the fence
  - distanceOfFence / initialHorizontalVelocity

parksEdgeTime

➔ NEEDS: Initial horizontal velocity
➔ Calculates the time it takes the ball to reach the edge of the park
  - distanceOfEdge / initialHorizontalVelocity

heightAtFence

➔ NEEDS: Vertical velocity, timeToFence, ball contact height
➔ Calculates the balls height when it reaches the fence
  - initialVerticalVelocity * timeToFence – .5 * GRAVITY * timeToFence^2 + contactHeight

heightAtEdge

➔ NEEDS: Vertical velocity, timeToEdge, ball contact height
➔ Calculates the balls height when it reaches the edge
  - initialVerticalVelocity * timeToEdge – .5 * GRAVITY * timeToEdge^2 + contactHeight

maxHeight

➔ NEEDS: Vertical velocity, ball contact height, gravity
➔ Calculates the balls maximum height
  - contactHeight + (initialVerticalVelocity^2 / 2 * GRAVITY)

airTime

➔ NEEDS: Vertical velocity, ball contact height, gravity
➔ Calculates the total time the ball is in the air
  - (-initialVerticalVelocity – sqrt (initialVerticalVelocity^2 + 2 * GRAVITY * contactHeight)) / -GRAVITY

distanceTraveled

- ➔ NEEDS: ballTravelTime, horizontal Velocity
- ➔ Calculates the total distance the ball travels
    - initialHorizontalVelocity * ballTravelTime

hitResult

- ➔ NEEDS: height AT Fence, height AT Edge, height OF fence, height OF edge, distance traveled
- ➔ Calculates where the ball lands
    - If ballHeightAtEdge > 30 && distanceTraveled > distanceOfEdge
        - Out-Of-Park
        - result = 2
    - If ballHeightAtFence > 10 && distanceTraveled > distanceOfFence
        - Homerun
        - result = 1
    - Otherwise it's in the park
        - result = 0

Output

- ➔ NEEDS: distanceBallTraveled, ballTravelTime, maxBallHeight, result
- ➔ Outputs Distance traveled, airtime, max height, and where the ball lands