

Player is at (0,0). Forward direction/pdx/pdy set according to Player Angle (see pdx pdy diagram)

Note: when moving sideways, px is +- pdy and py is +- pdx as the player is moving perpendicular to the player angle

$$\begin{aligned} px &= 0 & py &= 0 \\ pdx &= 0 & pdy &= 5 \end{aligned}$$

Leftward Direction (A)

$$\begin{aligned} px &= px - pdy = 0 - 5 = -5 \\ py &= py - pdx = 0 - 0 = 0 \end{aligned}$$

A = (-5, 0)

Forward Direction (W)

$$\begin{aligned} px &= px + pdx = 0 + 0 = 0 \\ py &= py + pdy = 0 + 5 = 5 \end{aligned}$$

Player = (0, 0)

D = (5, 0)

Rightward Direction (D)

$$\begin{aligned} px &= px + pdy = 0 + 5 = 5 \\ py &= py + pdx = 0 + 0 = 0 \end{aligned}$$

Backward Direction (S)

$$\begin{aligned} px &= px - pdx = 0 - 0 = 0 \\ py &= py - pdy = 0 - 5 = -5 \end{aligned}$$

S = (0, -5)