

SBirds Avengers

In order to simulate the physics of the game, s-birds Avengers takes into account four decision parameters related to the given structures: displacement, support, penetration, and downward factor. The *displacement factor* models the toppling effect of a bird-shot at a target block within the structure. In other words, it measures the horizontal component of force. The *support factor* models the equilibrium of the structure at a target base block. *Penetration factor* measures the reachability of a target block with respect to a bird type and also, the impact of the shot. Finally, *downward factor* models the crushing effect of a bird-shot and, hence, measures the vertical component of the force. These factors along with all the possible target point on a particular block gives us an empirical evaluation in which each of the decision parameters has a different degree of dominance in deciding the efficiency of a bird-shot. Further, we implement a strategy named Explore and Exploit, where a bird first in the queue for the slingshot works as a precursor so that the bird next to it gets a possible path for maximum destruction. Lastly, a basic analysis of the structure, categorising the structure into triangle, inverted-triangle and a polygon with 4 sides. This analysis helps in deciding the possible weaker block for a given structure type.

All the above mentioned factors along with the strategies aims to destroy the structure with maximum possible score pool.

Strategies:-

- **Find the best Hit**, evaluation of all the possible target point of all the blocks on the basis of the factors are done through weights assigned to each type of object in the structure. Destruction causing factors which includes support, how much weight does the block hold; displacement, how much weight it will destroy when hit from the side; downward factor, how much weight it destroys when hit from at the top. Then comes the penetration factor which includes the weight in the path of the bird and target point. Evaluation is then sorted in an decreasing manner with the top most point being the most destructive and penetrable.
- **Explore and Exploit**, for this strategy a continuous evaluation of both, the bird first in the queue for the slingshot as well as of the bird next to it is necessary. This evaluation is done through the major factors which includes, Penetration i.e. possibility of the bird to penetrate the structure to reach the target point of the target block, support factor i.e. how much weight does the target block hold which eventually after the hit gets destroyed and lastly displacement factor, this includes the destruction caused by the target block horizontally. This evaluation of both the first and the second bird in the queue along with all the possible target blocks is recorded. Now, if in a case for the second bird the overall destruction causing factors, i.e. displacement and support are not being exploited due to the penetration factor which can happen because the particular type of bird makes less harm to the type of structural material, then the strategy Explore and Exploit is made in use. Now in this instead of choosing the best out of the worst, we make a bad shot which

hits as many blocks as it can which are in the way of the second bird. Making a way for the second bird to get us with the maximum result and hence Exploiting the structure.