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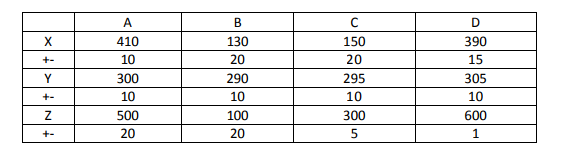
Games Development Help Guide

Sort and Sweep

The Sort and Sweep Algorithm (Sweep and Prune) is used for rigid bodies when detecting collisions between numerous objects. It gives out the intervals on the objects which are intersecting each other when a collision occurs. Sort and Sweep is part of the Broad Phase where the rigid body pairs might collide depending on the intersection of the shapes.

e.g 2016-17 Exam Question

The following table outlines the positions and ranges of the AABB's for 4 objects, A,B,C and D. Apply the Sort and sweep algorithm to determine if a collision has occurred.



The first step is to sort out each axis from the x to the y axis to the z axis. The numbers given for each axis are placed in numerical order from lowest to highest. This is known as the Sorting Section of the Sort and Sweep algorithm.

X Axis

A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BStarts(BS) | CS | BFinishes(BF) | CF | DS | AS | DF | AF |
| 110 | 130 | 130 | 170 | 375 | 400 | 405 | 420 |

The next step is to determine if collisions will occur based on the starting and finishing positions of the collisions in the X, Y and Z axis by simply adding or removing the range letters. This is known as the Sweep part of the Sort and Sweep algorithm.

X Axis

B

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| B | B,C | C | Null | D | D,A | A | Null |

The last step is to confirm if collisions will take place between two letter ranges e.g, (B, C) which is part of the Sweep section of the Sort and Sweep algorithm.

X Axis

C

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Null | (B, C) | Null | Null | Null | (D,A) | A | Null |

Y Axis

A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BS | CS | AS | DS | BF | CF | AF | DF |
| 280 | 285 | 290 | 295 | 300 | 305 | 310 | 315 |

B

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Null | B,C | B,C,A | B,C,A,D | C,A,D | A,D | D | Null |

C

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Null | (B, C) | (B, A),  (C, A) | (B, D), (C, D), (A, D) | Null | Null | Null | Null |

Z Axis

A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BS | BF | CS | CF | AS | AF | DS | DF |
| 80 | 120 | 295 | 305 | 480 | 520 | 599 | 601 |

B

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| B | Null | C | Null | A | Null | D | Null |

C

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Null | Null | Null | Null | Null | Null | Null | Null |