**Ian Sweeney – Exam Paper 2017-18 Q3**

1. **BIOT**
   1. BIOT or Binary Image Overlap Test was a test used to determine collision detection on a 2D plane, used by coin-operated arcade games
   2. (24, 60, 102, 231, 255, 126, 102, 195)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

* 1. 128 64 32 16 8 4 2 1
  2. Sprite1 (ii) 100, 105 (Top Left) - 108, 113 (Bottom Right)

Sprite2 (iii) 105, 107 (Top Left) - 113, 115 (Bottom Right)

BIOT would not detect a collision

100 101 102 103 104 105 106 107 108 109 110 111 112 113

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 105 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 106 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 107 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 108 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 109 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 110 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 111 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 112 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 113 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 114 |
|  |  |  |  |  |  |  |  |  |  |  |  |  | 115 |

1. **AABB**
   1. AABB’s are not accurate because they align to the axes, which means if a 3D object is rotated at an angle not parallel to the axes the game world is operating on the boxes will be very innacurate

AABB’s are used within modern game engines because in situations where their inaccuracy is not a serious issue, they are preferred over other collision detection methods as they are much more computationally efficient

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Player** | **Enemy 1** | **Enemy 2** |
| **X** | 105 | 100 | 148 |
| **+/-** | 14 | 4 | 12 |
| **Y** | 249 | 231 | 223 |
| **+/-** | 23 | 13 | 6 |
| **Z** | 33 | 39 | 21 |
| **+/-** | 8 | 3 | 6 |

|  |
| --- |
| **Z** |
| **Player:** 25 - 41 |
| **Enemy 1:** 36 - 42 |
| **Enemy 2:** 15 - 27 |



|  |
| --- |
| **Y** |
| **Player:** 226 - 272 |
| **Enemy 1:** 218 - 244 |
| **Enemy 2:** 217 - 229 |

|  |
| --- |
| **X** |
| **Player:** 91 - 119 |
| **Enemy 1:** 96 - 104 |
| **Enemy 2:** 136 – 160 |

**(**Player : P - Enemy 1 : E1 - Enemy 2 :E2**)**

**X** :

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Event** | P-Start | E1-Start | E1-End | P-End | E2-Start | E2-End |
| **Active** | P | P, E1 | P |  | E2 |  |
| **Collisions** |  | P – E1 |  |  |  |  |

**Y** :

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Event** | E2-Start | E1-Start | P-Start | E2-End | E1-End | P-End |
| **Active** | E2 | E2, E1 | E2, E1, P | E1, P | P |  |
| **Collisions** |  | E2 – E1 | E2 – P, E1 – P |  |  |  |

**Z** :

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Event** | E2-Start | P-Start | E2-End | E1-Start | P-End | E1-End |
| **Active** | E2 | E2, P | P | P, E1 | E1 |  |
| **Collisions** |  | E2 – P |  | P – E1 |  |  |

**Conclusion**

Player collides with Enemy 1 on all three axes, therefore a collision has occurred between the Player and Enemy 1