FGAG Report

a). An explanation of the underlying physics model used to handle elements in the simulation or game using the **particle physics model**. You should include appropriate diagrams and formulae and relate these to the code structures used in your application

For the displacement of particles within the system this equation was used to achieve this :

d = vt + 1/2at^2

v = v + a

// Update world position of object by adding displacement to

// previously calculated position ( P = P + (V \* T) + (0.5 \* A \* T^2))

\_transform->SetPosition(\_transform->GetPosition().x + (\_velocity.x \* t) + (0.5f \* \_acceleration.x \* t \* t),

\_transform->GetPosition().y + (\_velocity.y \* t) + (0.5f \* \_acceleration.y \* t \* t),

\_transform->GetPosition().z + (\_velocity.z \* t) + (0.5f \* \_acceleration.z \* t \* t));

// Update velocity of object by adding change relative to previously

// calculated velocity ( V = V + (A \* T))

\_velocity = XMFLOAT3Methods::Addition(\_velocity, XMFLOAT3Methods::MultiplicationByValue(\_acceleration, t));

To get the net force to calculate the particle’s acceleration, the equation for that requires the addition external forces, which are then summed up to get the final acceleration value.

Force = Mass \* Acceleration

Force / Mass = Acceleration

// Calculate acceleration from the net external force

\_acceleration = XMFLOAT3Methods::MultiplicationByValue(\_netForce, \_inverseMass);

b). An explanation of the underlying physics model used to handle elements in the simulation or game using the **rigid body physics model**. You should include appropriate diagrams and formulae and relate these to the code structures used in your application

c). An explanation and a justification for using the AI methods used to support the multi-body control system employed in the racing mechanic used in the game or simulation

d).A discussion of the assumptions and simplifications made to balance performance against accuracy of the simulation and a reflection of the quality of the product with suggestio0ns for potential improvement in future implementations.