Animation for Computer Games
COMP 477/6311

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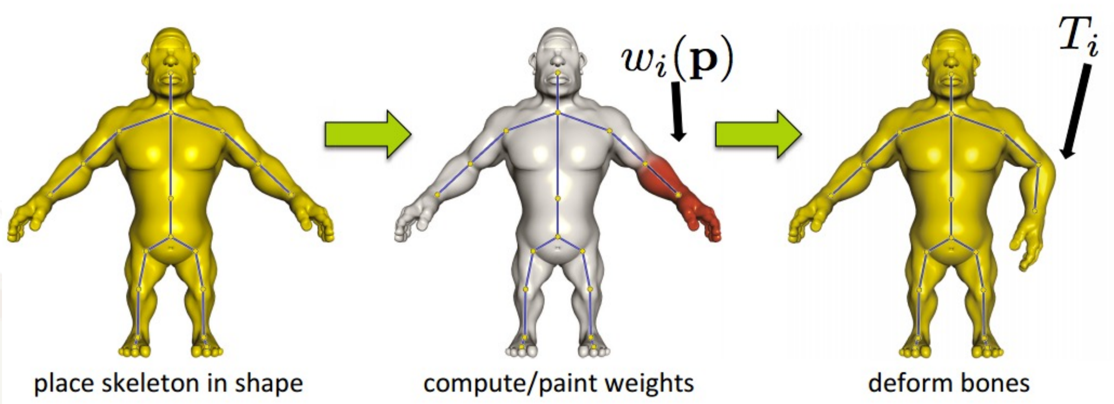
Forward Kinematics – part deux

Character Animation

Skeleton not the only rigging possible, but a classic widely used in games today

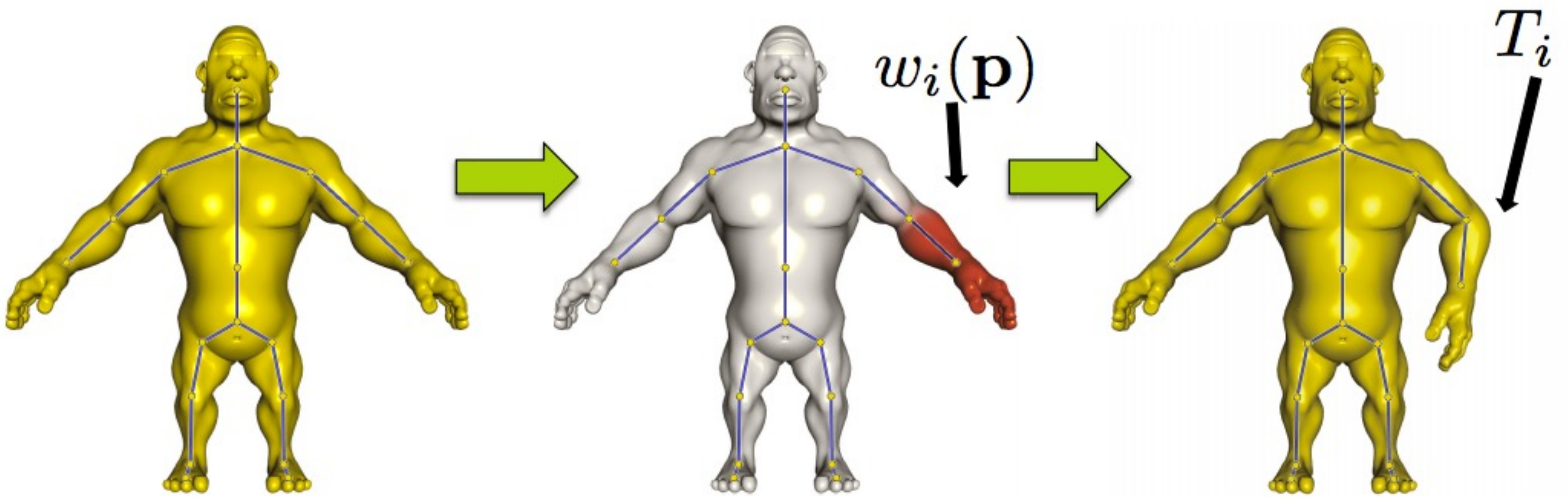
1. Construct and attach the skeleton to skin
2. Pose the skeleton
3. Transform the character
4. Interpolate transformations (i.e. rotations)

$$\mathbf{p}' = \sum_{i \in B} w_i(\mathbf{p}) T_i \mathbf{p}$$



Character Animation

$$\mathbf{p}' = \sum_{i \in B} w_i(\mathbf{p}) T_i \mathbf{p}$$



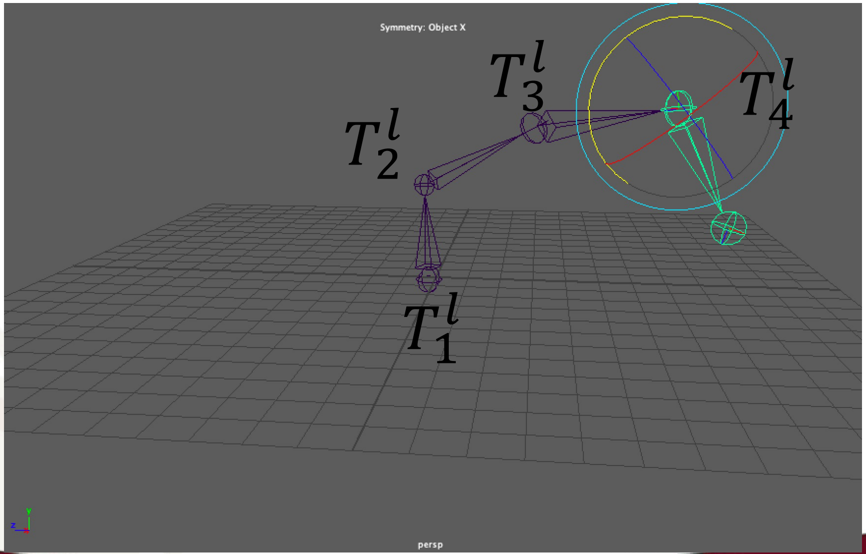
place skeleton in shape | compute/paint weights | deform bones

Character Animation

Transformations $T_1^l \ldots T_4^l$ - expressed locally w.r.t. the coordinate frame of the parent joint

When applying the skinning equation → transformation w.r.t the world coordinate frame (i.e. the translation business we saw earlier)

Question 1: How do we convert from T_i^l to T_i^w

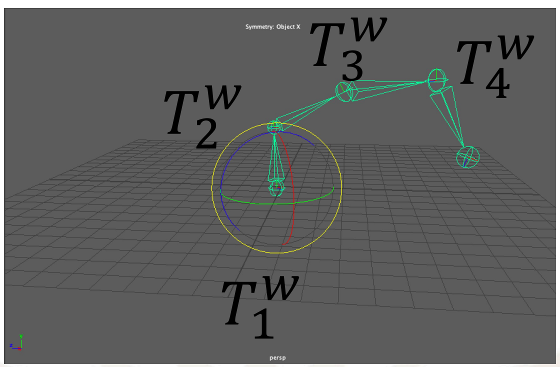


$$\mathbf{p}' = \sum_{i \in B} w_i(\mathbf{p}) T_i \mathbf{p}$$

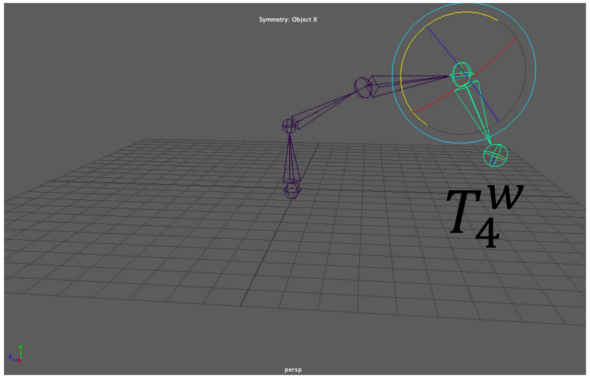
Character Animation

Transformations $T_1^w .. T_4^w$ are expressed w.r.t the world coordinate frame so we could use them in the skinning equation if not for an additional problem?

Frame of the parent joint → also inherits the transformations from parents



$$T_4 = T_1^w T_2^w T_3^w T_4^w$$
$$T_3 = T_1^w T_2^w T_3^w$$
$$T_2 = T_1^w T_2^w$$
$$T_1 = T_1^w$$



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