

Animation

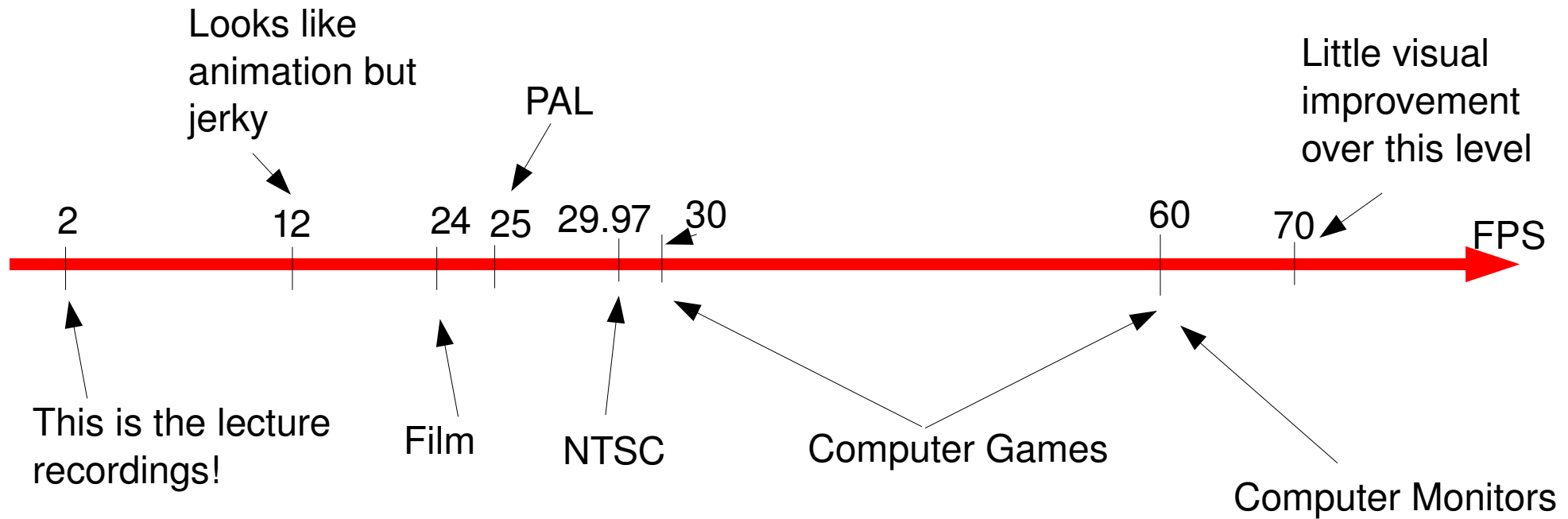
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- Computer Animation refers to any time sequence changes in the picture displayed.
- Computer Animation can be:
 - real-time animation – the animation sequence is viewed as it is created.
 - frame-by-frame animation – frames are created one by one and stored to be played back at a later time.
- The illusion of movement is created by rapidly changing frames where each frame renders the scene after a small change in the time domain.
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- **double buffering** – drawing directly to frame buffer creates flickering and tearing. Double buffering draws to a different buffer and moves this screen image data over in sync with and ahead of the raster beam to the frame buffer. **Page flipping** is also a form of double buffering where the pointers to the frame buffer and drawing buffer area is switched between each other in sync with the raster beam.
- Animation can also be created using:
 - **hardware sprites** – hardware that intercepts and modifies the data going from the frame buffer to the raster beam. Used in many games systems.
 - **colour table transformations** – modifications in colour tables can create simple animation effects.

- Design of an a simple animation can be done using the following steps(as listed in Hearn et al.):
 - Storyboard Layout
 - Object Definitions
 - Key-Frame Specifications
 - Generation of In-Between Frames

- Animators use a variety of often overlapping approaches for controlling and directing animation. These include:
 - frame by frame explicit control
 - direct motion specification
 - goal-directed systems
 - constraint based
 - actors
 - tracking live action
 - kinematics
 - dynamics
 - physical based animation

- **squash and stretch** provides a powerful animation indicator.
- Avoid sudden jerky motion as it is extremely distracting. This is both for the camera position and objects in the scene.
- stage your action. Select your viewing position carefully. Provide the most information to the view. Only a single item at any one time should occupy the viewers attention.

- Temporal Aliasing – jerky movement of objects in the scene, wagon wheels moving backwards! Solutions: increase the temporal resolution; use a weighted average over multiple samples.
- There is a large amount of pixels to calculate and render. Solutions: space-time can be partitioned and rendering calculations can be in this domain.
- Human movement is very complex to model/describe.