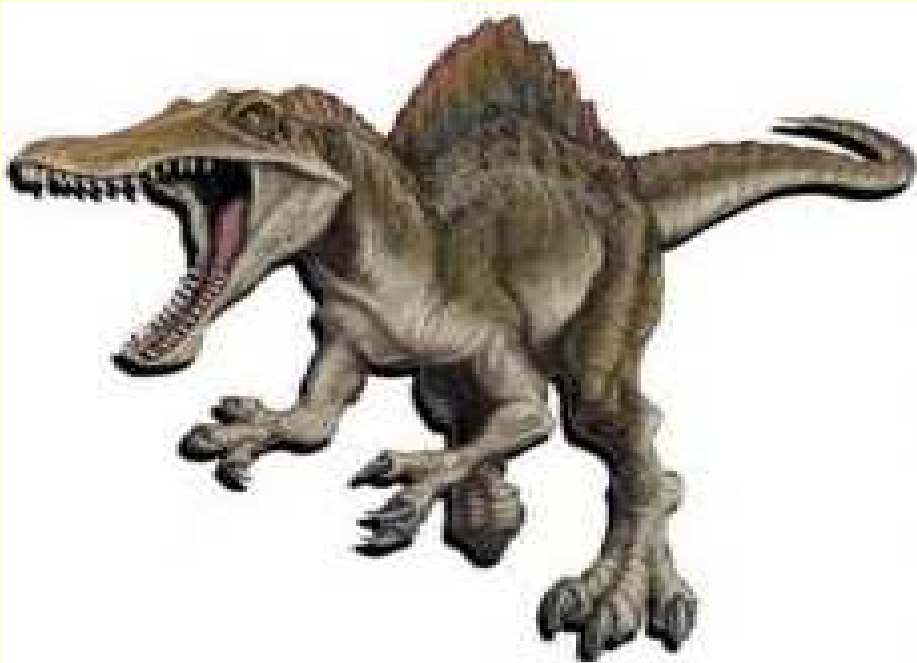


# Topic : ANIMATRONICS



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# Introduction of Animatronics

- The first use of Audio-Animatronics was for Walt Disney's Enchanted Tiki Room in Disneyland, which opened in June, 1963.



- The Audio-Animatronics has changed into movie-animatronics with the usage of engineering technologies.

# TIKI ROOM CREATED BY WALT DISNEY



# What is Animatronics ??

- Animatronics is the technology employing electronics to animate motorized puppets. An animatronic figure is often used in movies to create grand special effects.
- Animatronics are specific type of Robot but they differ from common robots as they are used in entertainment field.



# Various Animatronic Figures Created



# Early Development Of Animatronics

- Examples of elementary puppets have been found in early Greek, Hindu, and Egyptian cultures
- The first puppets were marionettes. Later, the rod puppet was developed in Bengal
- During the Renaissance, automata were created to amuse royalty.

# Early Animatronic Figures





# Formation of Animatronics

## Different Stages !!

- Design Process
- Sculpting
- Mold Making
- Armature Fabrication
- Costuming
- Programming



# Formation of Animatronics

- **Step 1: Design Process**

During the design process, the client and the company developing the animatronics decide what the character will be, its appearance total number of moves, quality of moves, and what each specific move will be. Budgets ,time lines and check points are established. Many years have been spent to ensure that this critical step is as simple as possible...

# Formation (Contd..)

- **Step 2: Sculpting**

The sculpting department is responsible for converting two-dimensional ideas into three dimensional forms. Typically, the client is asked to approve the sculpting before it goes to the molding department.



# Formation (Contd..)

- **Step 3: Mold making**

The molding department takes the form created by the sculptor and creates the molds that will ultimately produce the character skins. Molds can be soft or hard, single or multiple pieces, and reusable or non-reusable. The process can be very time-consuming and complicated.



# Formation (Contd...)

- **Step 4: Armature Fabrication**

Meanwhile, various body armatures are being created and are assembled in the welding metal-fabricating areas. Each of the robot's movements axis points must have an industrial-rated bearing to provide action and long life.



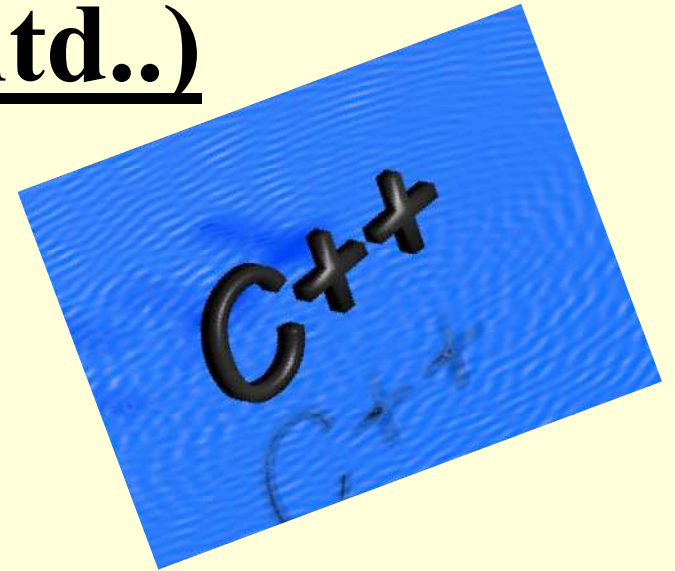
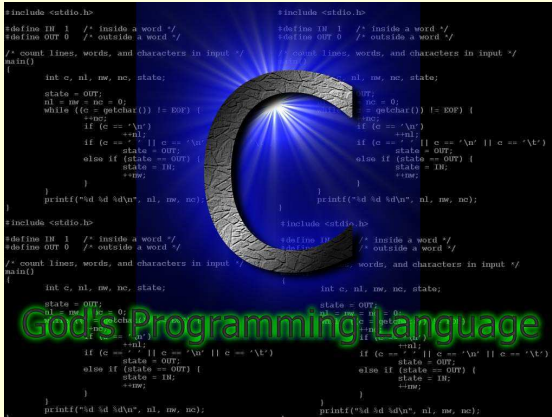
# Formation (Contd..)

- **Step 5: Costuming**

The costume, if there is one, is usually tailored to the character and its movements. Animation tailoring can be a very difficult tedious process considering the variables . The outfit has to allow for easy acces to the character's operating mechanisms..



# Formation (Contd..)



## Step 6: Programming

- Programming is the final step, and for some animations it is the most rewarding. Programming can be done either at the manufacturing facility or at the final installation site. Programming is the final step, and for some animations it is the most rewarding.
- It can be explained by using SSU-1 Animatronic structure

# SSU-1 ANIMATRONIC STRUCTURE

- Major physical feature of SSU-1 is a Styrofoam head made for storing wigs which was then hollowed out to make room for the mechanical controls, electrical actuators, and electronics
- The hardware section of SSU-1 uses Cypress PSOC (CY8C26443-24PI) microcontroller.
- Mini SSC Panel is the another software used.





# Programming for SSU-1

- The hardware section of SSU-1 uses Cypress PSOC (CY8C26443-24PI) microcontroller [7]. The microcontroller is programmed in C language to control different facial mechanism of the SSU-1.
- The role of the control electronics was to create a clean interface between the SSU-1 and the high level C++ programming language and FreeStyler512 software to control the SSU-1.

# Programming Cont...

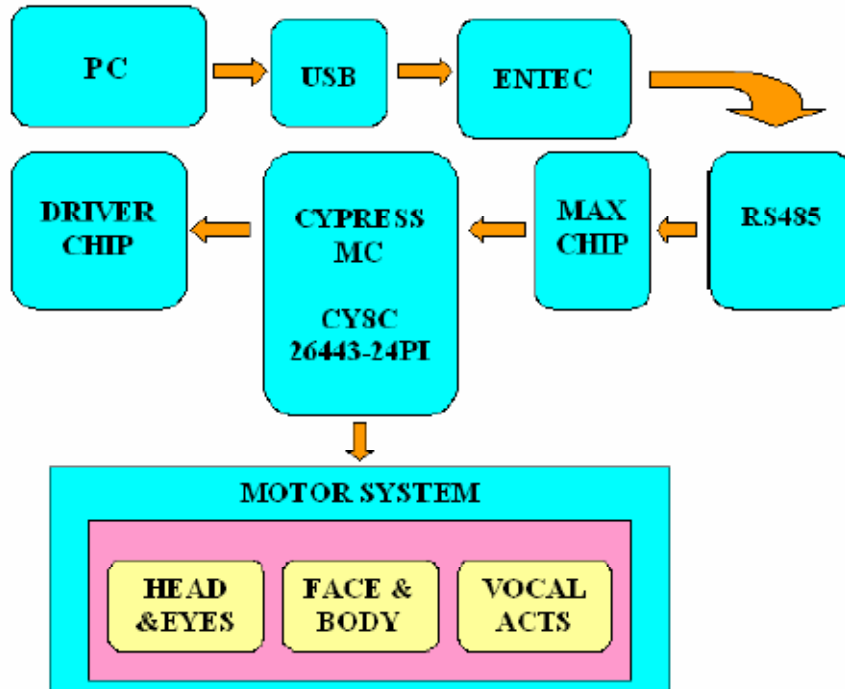


Figure 2: Hardware and Software Interface of SSU-1



# Programming Contd..

- The DMX 512 and MIDI protocols are two major standards used by Hollywood, the music industry and theme parks
- MIDI formatted files can be used to play music or voice over PC. DMX 512 has been traditionally used to control theatre lighting but has been adapted to control animatronics display's and robots.

# Programming Contd...

## Servo Animators

The animation that you create allows your animatronics to be actuated with smooth movements instead of jerky, unnatural movements. Servo Animator allows you to sync your movements to a sound file so that your characters will be able to lip sync with the sounds!



**MAKING OF ANIMATRONICS**  
**SPINOSAURUS USED IN JURASSIC**  
**PARK**

- Put it on paper.
- Build a maquette (miniature model).
- Build a full size sculpture.
- Create a mold (from the sculpture) and cast the body
- Build the animatronic components.
- Put it all together.
- Test it and work out any bugs.

# PUT IT IN THE PAPER

- The first thing that happens with any animatronic figure is that an artist creates preliminary sketches of the creature. The Spinosaurus sketches were developed by working closely with expert paleontologist Jack Horner and the crew working on “Jurassic Park III”.



# Build a Maquette

- From the final paper design, a miniature scale model called a **maquette** is created. Fashioned out of clay, the first maquette SWS made of Spinosaurus was one-sixteenth scale. This initial maquette is used to verify that the paper design is accurate.



# Build as a full Size Sculpture

- Once the sketches and models are done, the full-size building begins. Build a Full-size Sculpture For the animatronic dinosaurs in the original "Jurassic Park," SWS had to build the full-size sculpture by hand, a time-consuming and laborious process.



# Molding

- A set of molds are made of the full-sized sculpture. The molds are made from an epoxy that is very durable and has strong bonding characteristics.





# Creature Creation

Consists of four Main Category that work splits into :-

- (a) Mechanical
- (b) Electronic
- (c) Structural
- (d) Surface



Working on the head of Tyrannosaurus rex

# Putting it all together

- When all the components are done, it's time to build the Spinosaurus. The frame is put together and then the mechanical systems are put in place. As each component is added, it is checked to ensure that it moves properly and doesn't interfere with other components.



# Painting it and Test it and work out for any bugs

- The skin is mostly "painted" before it is attached to the frame. Stan Winston Studio does not use actual paint, though. Instead, a specially formulated mixture that is akin to rubber cement is used. Once the animatronic device is complete, the team has to test it and work out any problems



# Making The Creature Move

- The people that control the animatronic figure are called puppeteers, because that is all that an animatronic device is a sophisticated puppet. These puppeteers are skilled actors in their own right and will spend some time with the animatronic figure learning its range of movements.



# Method Used in Moving a Creature

The puppeteer who controls the arms has a device that he straps onto his own arms. He then acts out the movement he wants the Spinosaurus to make, and the telemetry device translates his motion into a control signal that is sent to the circuit board controlling the mechanical components that comprise the arm system of the Spinosaurus.





# Applications of Animatronics

- Animatronics are mainly used in entertainment field.
- Animatronics are used to give special effects in movies.
- Animatronics creatures are used in disney land to entertain visitors.



# Future Development of Animatronics

- It can be speculated that animatronics will not be a large player in the future of cinematic special effects and theme parks. Because of the growing ease and versatility of computer graphics,.
- Newer theme parks are built around attractions such as roller-coasters and the importance of visual stimulation such as animatronic figures has been downplayed in favor of the thrill of an adrenaline rush..



# Summary

The realistic creatures that it can create are amazing and is rewarding to its creator. With the Advent of Animatronics entertainment world has got its own prominence among all other fields. This Shine to animatronics is because of Engineering Technologies !!!.



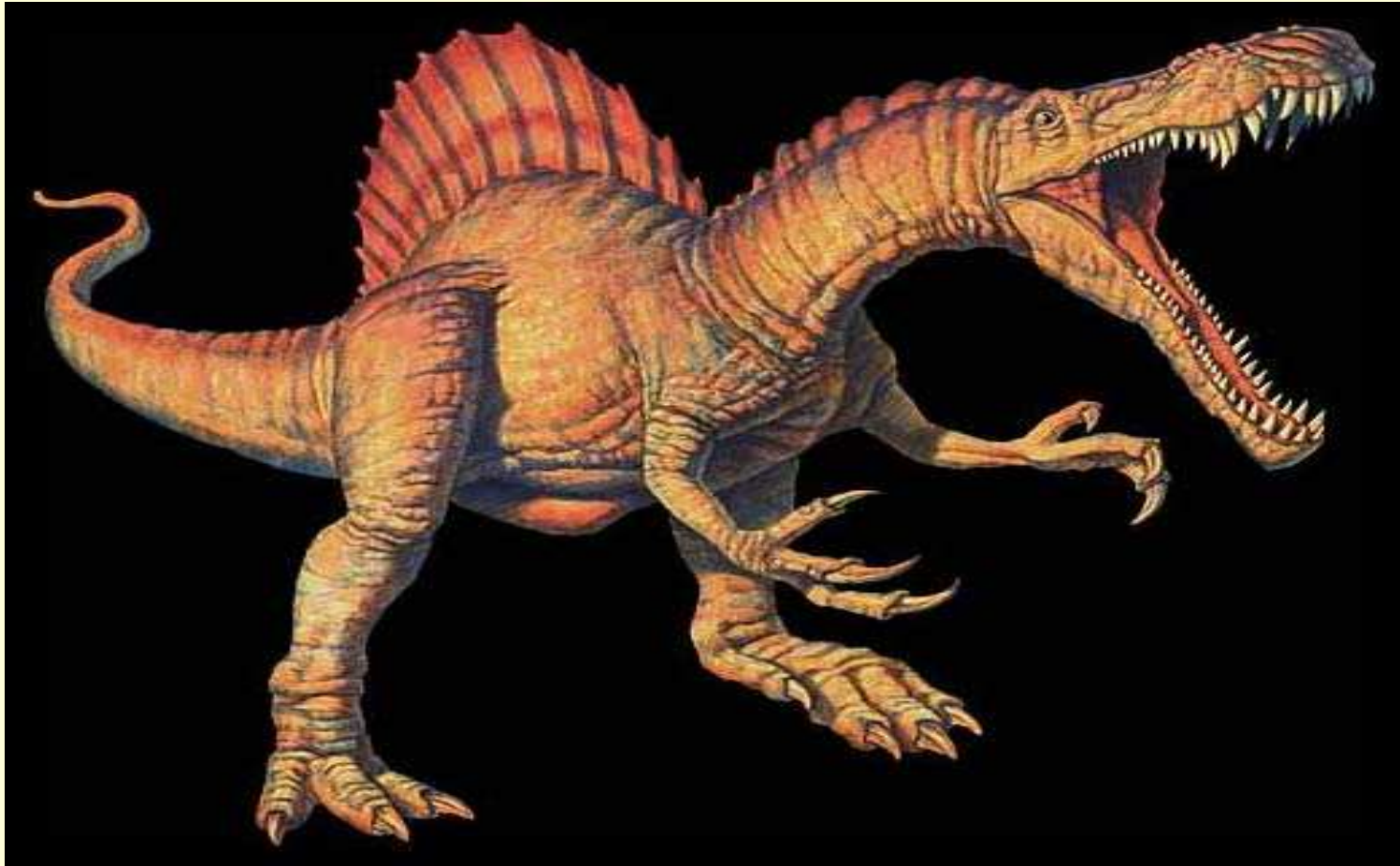
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# QUERIES ???







**THANK YOU !!!**