

# **12 basic principles of animation**

The Twelve Basic Principles of animation have been developed by Ollie Johnston and Frank Tomas, Disney's top designers from the 1930's on «The illusion of life». The book is dedicated to "W. Disney and all designers who wore the magical quality of life in animated characters". His first edition in 1981 was celebrated as an "Industry Paper". In 1999, the book was voted number one "Best Animation Books Ever" in an online survey.

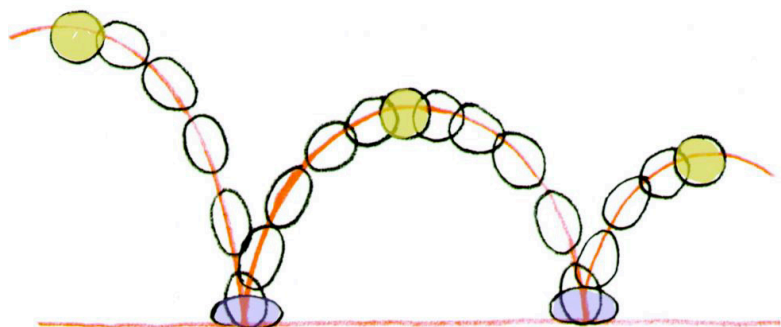
The main goal was to create an illusion of characters by paying attention to the fundamental laws of physics, but also to more abstract topics such as emotional state, timing, and character traction. Although originally intended for traditional animation, this is important in both computer animation and stop motion animation.

## the role of animation in education

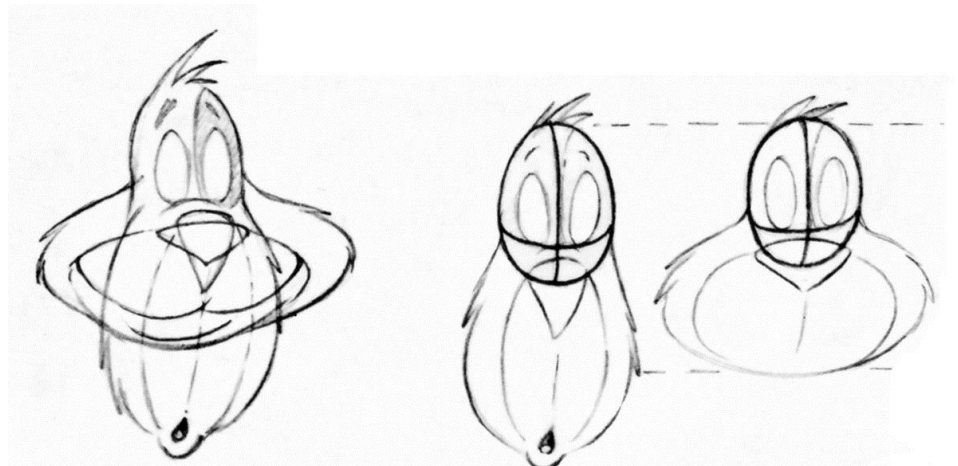
- The creation of movement is based on the observation of nature.
- The study of the basic principles helps to understand the movement and rhythm.
- Knowing the natural movement laws of a character or an object, the designer is able to choose which and when will exaggerate and why.
- The pace of movement is vital and communicates to give emotions. In this rhythm, the “push” and the sounds will later lead us to design of intermediaries.
- Tomorrow’s designer has these “basic” rules, he can avoid mistakes of inexperience while at the same time he learns to “push” his design on definitely and unquestionable steps. Later, the choice is personal whether the rules are trespassed or not.

### 1. Squash and Strench

In a moving figure (especially during intense exercise), the muscle system is supplied with continuous compression change and stretching. In this way, the character hero acquires flexibility in the body and is simultaneously attributed to the design of continuous muscle shifts. A very weak hero when he jumps is less compressed than a fat round hero. The basic principle of compression stretching is given by a bouncing ball in its simplest form. Warner’s American designers and M.G.M., TexAvery, Chuck Jones, FrizFeleng, Robert McKinson (and others) gave nice samples of madness and the power of animation



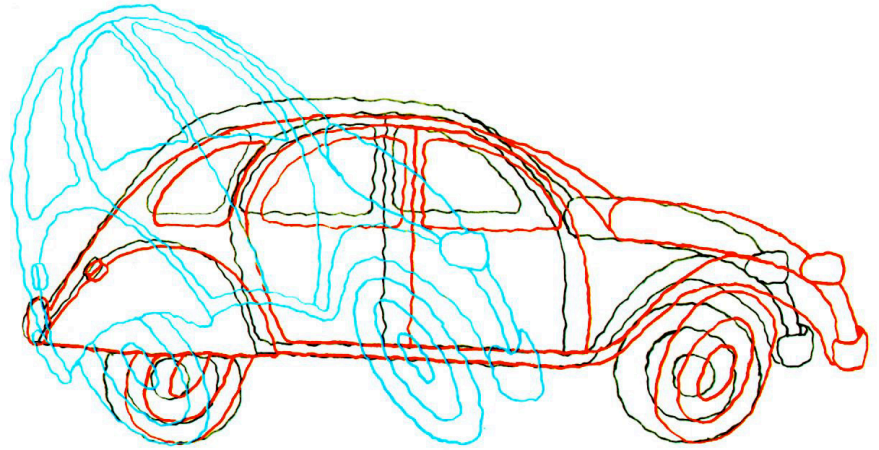
The implementation of this basic principle has a rule that is not violated. Any type of figure or object can be compressed and stretched to the edges, but will never lose its original three-dimensional volume. As much as it squeezes vertically, it expands horizontally and vice versa. The designer must never change the volume of his character, because then he changes his own hero himself.



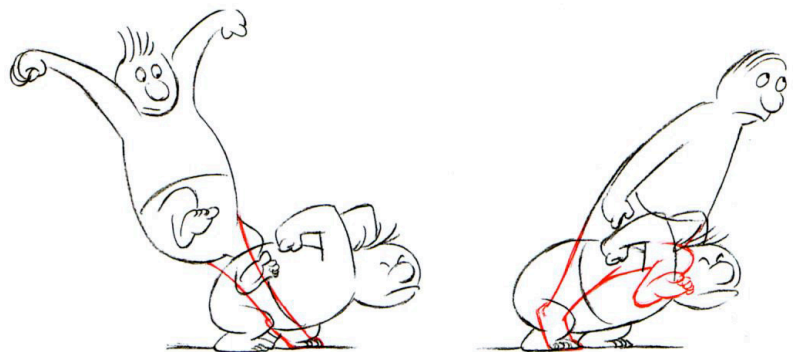
## 2. Anticipation

It is the basic reaction of the figure before every movement. It is used to prepare the viewer for the hero's next action, while his action is more pronounced and realistic. A figure from the static posture of the original extreme frame moves backwards in the final direction of the movement, taking a moment and starting to move. The designers follow Newton's law of motion, "for every action there is an equal and opposite reaction". This anticipation is necessary at the beginning of every movement

This happens either when moving from a static position, either when the movement changes the address and the time. A simple example is the start of a run. Before the figure starts to run to the left, he pulls the body to the right to get hold of fortresses.



A typical example is the observation of a martial artist during the attacks on the opponent. The athlete will first pull hand-in-hand from his body and then he will hit his opponent in front of him with the force he has gained through his desired reversal movement. The analogy occurs when the character starts a jump. First, he will gather to take forms and then he will swing up. Then in restoring to the ground, it will first push into the ground and then come back into the upright position. Anticipation is used as a precursor to change the direction of movement.



-While the designer is sketching the anticipation, he has in his mind the movement that will follow the figure. Also the figure's look is always facing the side of the expected movement.

- As an example: when the figure is preparing to run towards left, during anticipation and all intermediaries her gaze is on the left.

-When the athlete moves aggressively towards the opponent, his gaze is nailed to the point where it will give the hit at duration of the entire movement.

- When the figure starts to jump, it is pointing to the axis of the path to follow. The analogy also happens when he returns from the second anticipation to the upright static attitude.

- The technique can also be used for less natural energies, as in the case of a character that turns the body and his look off-screen to predict the arrival of someone else.

### 3. Staging

As a beginning it is based on the theater and identifies it setting up actresses (heroes on the scene) frame. It's aim is to direct the viewer's attention to the importance of the scene (in setting up the plan), so that he can lead him by sign in the action that will take place. The essence of this principle is to attend the viewer to focus on the meaning, avoiding them unnecessary details.



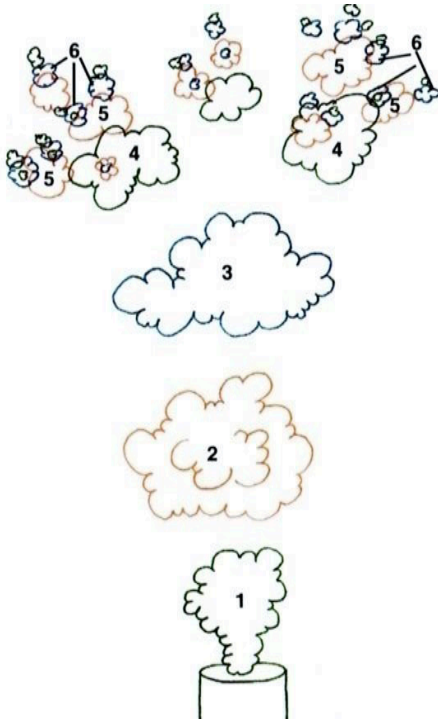
As a start, it is based on the theater and identifies it to visual actresses (heroes on the scene) framework. The goal is to focus the viewer's attention on the importance of the scene (in the preparation of the plan) so that he can guide him through the action that will take place. The essence of this principle is to join the viewer, focus on meaning, and avoid unnecessary detail.

As in the theater, the actors lock themselves in a specific location on the stage and move in predetermined locations to have the best possible synthetic and lighting presence, leaving the heroes of the animation on the background for 2D or in the scene for 3D. The best visual and lighting composition is developed during his course plan. This can be done in different ways, eg. By inserting a character into the frame, using light and shadow, angle, and camera position.

#### 4. Straight ahead action and pose to pose

There are two different ways to design the same movement. In the first case, the designer launches a picture and develops it, developing one intermediate after the other, until the final movement. Designing in this way gives fluidity and capacity in motion and is better in realistic scenes of action. But it is very dangerous for the designer to lose his proportions and the volume of his figure. Steps of intermediaries organize the time of the movement, but also in this case there are difficulties to follow them completely.





When drawing key plans (pose for positioning with key-frames and intermediaries organized via stairs), the movement is less fluent, even though the designer has absolute control over the design and does not risk breaking out of pre-organized times. The slow-movement settings (where dramatization and emotion prevail) are always designed for pose, because details play a crucial role.

When designing via a computer, e.g. For example, Flash animation, 3D computer animation, the design becomes a pose to organize in time key positions, and then the intermediates are automatically generated. Of course, in this case a renewed control of traffic and corrections are required.

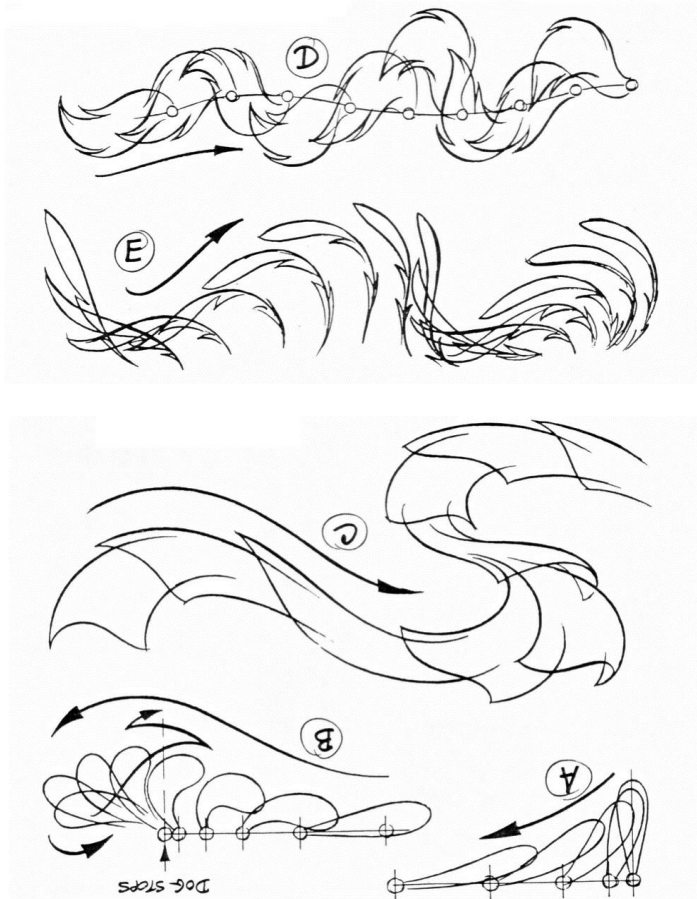
## 5. Follow thought overlapping action drag action

Consecutive are referred to as auxiliary movements in individual figures. Support the basic movement by giving the impression that the figure is following the laws of nature. So they offer realism in the main motive. "Movement" means that individual parts of the body of a figure continue to move after the basic movement is stopped. For example: The character runs, stops, but the chest goes up and down and flickers on legs or hands, etc. "Overlapping motion" means that body parts are synchronized differently from the main motion. As an example, the character runs, stops, but his hands spin in the air to put tension on the brake.

"Moving" means that parts of the figure, such as clothing, hair, hands, feet, move a few frames later than the basic movement. These parts "crawl" behind the main train and even the direction changes.

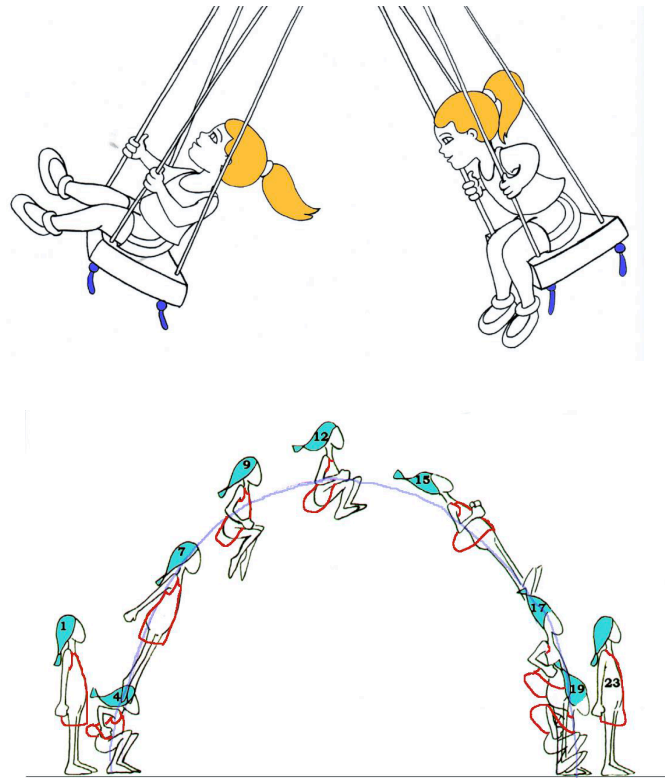


The “following movements” are created as a result of the main movement of the body. They follow him completely at the connection. But they have an independent movement on their other end. A girl with long hair or a woman with a big chest or a hound with big ears are very prone to such movements.



- A. The ears of the dog that starts to run.
- B. The same ears in braking.
- C. Fabric or paper movement in the air.
- D. Horse tail.
- E. Bird feather. The same move can have bangles or ribbons.

In this example, the swinging hair and the edges of ropes change the address when the swing is in the middle of the movement. In salty, it follows the way of the hair and the dress.

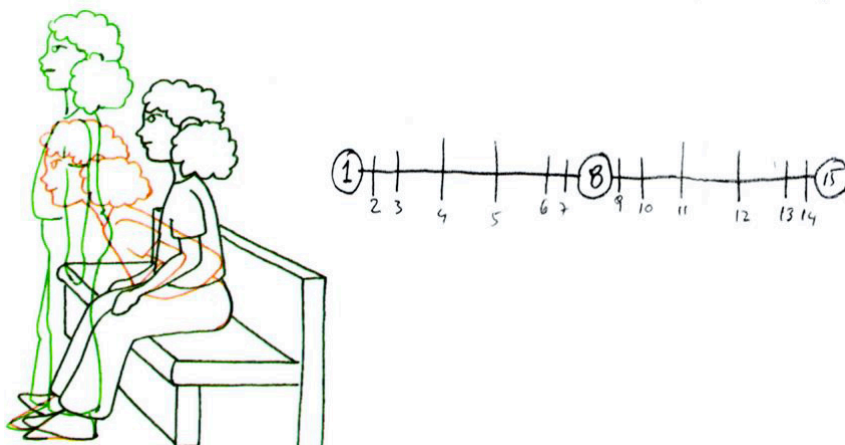
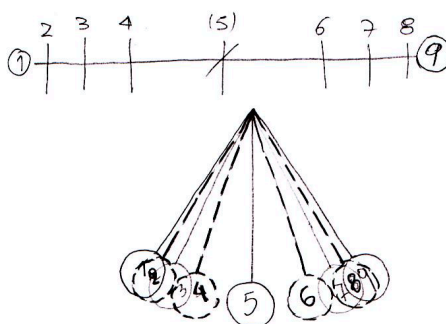


According to Thomas and Johnston, even in a static figure, the natural small movements such as breathing should be immobile, so it is not an inanimate figure. The designer must pay attention to the tensions of these movements, because although they offer realism, exaggeration can lead to comics and ridiculous results.

## 6. Slow in and slow out

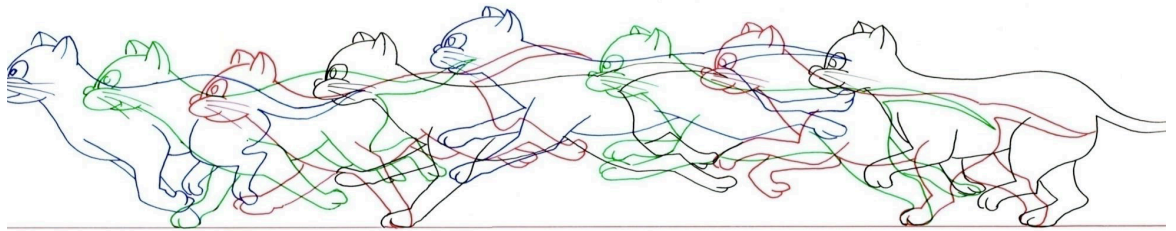
The movement of the human body as well as the most animated and inanimate objects take time to accelerate and slow down. Otherwise there will be “hitting” in the movement at the beginning and end of it.

Because of this, every moving image, from animation to motion graphics, looks more realistic when it has more frame, time, beginning and end of the traffic, and less waist. This principle also applies to the characters who move between two extreme stops, such as from the sitting position to get up, but also inanimate and moving objects.

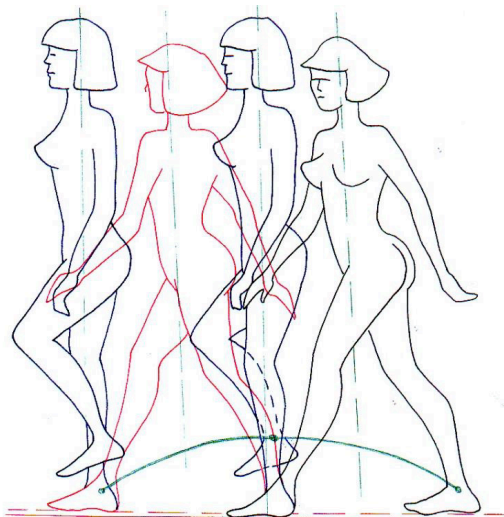


## 7 Arcs

The physical movement follows a leaf trace. Nowhere in nature are the movements absolutely linear. Think about the movement of leaves, waves, human hands and Feet. So the designer should always follow in curves to deliver realism in his design.



In a typical example, the hero throws an object. This will always make an elliptical orbit and never be straight. Conversely, mechanical movements are e.g. Piston in a machine cart or a production chain in a factory.



## 8. Secondary action

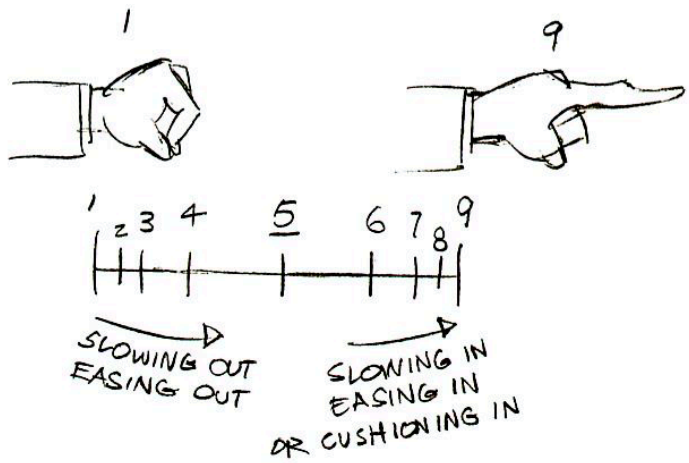
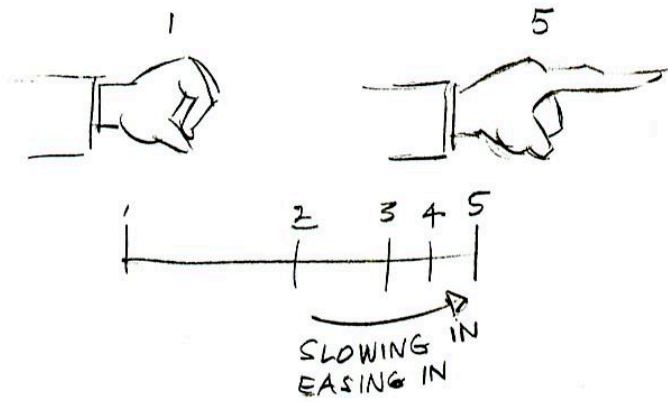
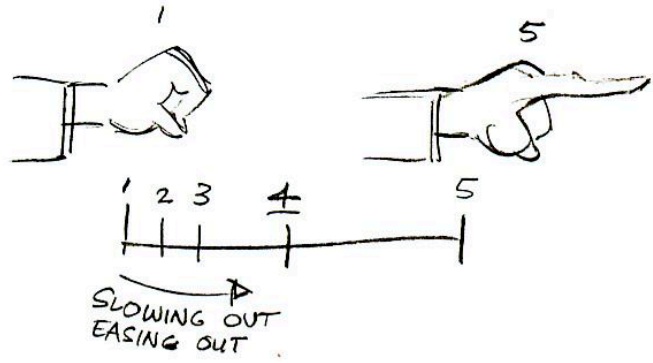
By adding a secondary movement to a master movement, the plan learns to know more life and realism while strengthening the main movement.

A hero can talk and speak on a mobile phone by expressing his words with his body or lifting his socks or turning his head to observe something we will look at the next shot. There is an interesting Rancor.

But these little moves should only emphasize the capital and not “steal the show”. However, if there is a risk of distraction, it is better to leave the secondary movement. If we need to emphasize expressions for dramatic reasons, it’s better to do them either at the beginning or end of the plan, or with a close-up wedge.

## 9. Timing

The “time” last a move. This time is counted by the number of frames that you have correspond to the motion, in relation to the frame rate. The right timing, faithfully follows the laws of physics. For example, a metal ball and a plastic ball fall from a certain height. Which one will reach the ground first? The same character walks and runs, which of the two moves are quicker? The timing of a hero is vital for the determination of character and its mood and communicates to perform feelings and reactions. Therefore he also identifies his personality. In an inanimate object, it is determined by the weight, the elasticity and the material.





Excitement traffic is particularly useful in animation, otherwise there is only an imitation of reality, which is enough static and painful. Of course, the level of excess is totally dependent on the design and character of the hero, as well as the style of the film.

If the hero, but also the form of the film is realistic, it is possible to follow in the movement intense exaggerations. Disney suggested his designers remain true to reality, though with tension. At the same time, Tex Avery introduces the element of absurdity and creates the movement of the impossible with the additional animation.

Or a purely personal aesthetic with surreal elements becomes a school. Or exaggeration in extreme drawings, and very fast and fragmentary rhythms become the style Warner and Metro Goldwyn-Mayer.

Of course, the use of excess should also be supported by the scenario itself. The unity of components and design is balancing - character is the thing, otherwise the excess for overstatement simply creates confusion and visually "hits".



## 11. Solid drawing

The principle of uniform design takes into account the shapes imprinted in three-dimensional space, always keeping their volume and weight. The animator must be an experienced designer who understands the basic three-dimensional shapes, anatomy, weight and balance of his figure, as well as the light and shadow in the place where he belongs.

Giving life to lifeless objects presupposes that the designer has studied the art of the animator. Usually, the designer at work begins to clean the shelf patterns and then draw in between. This experience helps him to become a good animator.

A special feature that Johnston and Thomas emphasized was the creation of “twin” characters whose left and right sides are mirrored. They are lifeless heroes and tend to construct. The question of “twin” characters is very intense in computer design, though the benefits of this type of design at work and hours are enormous and therefore subject to charge. Often, computer animation uses plug-in help to correct mechanical movement and image problems, as well as intentional “bugs,” so that the result is closer to classic design and mechanical perfection is avoided.

## 12. Appeal



A character's design must look attractive to the viewer, whether the character is evil or a monster. The character beyond the design must follow in the movement and in the expressions of its characteristics its personality and that it is also attractive to the viewer.





Feature is the example of Disney movies, where are usually the bad characters who “steal the show”. Since the actress “writes” and recognizes as face, style, movement in the film, an animation character should have the same readability. Disney uses tricks like symmetrical design, curves, pedicure features, etc. Monster

