

Using Adobe Photoshop to Create Digital Cartoons or Caricatures (First File)

Edward Locke

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Introduction

Purpose of this Directed Study

This directed studies project is intended to develop a step-by-step instructional tutorial showing how to use Adobe Photoshop tools to transform pictures taken from nature and life persons into digital cartoons or caricatures. Professor Steven Monaci at the Art Department of East Los Angeles College has offered advice and guidance on aesthetics and Photoshop tools. Student Edward Locke, the author of this article, has created the Tutorial independently using his own images for the project, which include images of digital animals created in 3ds MAX, images of landscapes, and images taken from ELAC students serving as models. Unless quotations are added in the notes accompanying the Figures, all images used in this Tutorial are created by Edward Locke, the author of this research paper.

This study might help college students enrolled in computer art courses, especially those related to Adobe Photoshop skills, learn some useful tools in mastering Photoshop special effects and in creating humorous illustrations.

Cartoons and Caricatures

Cartoons and caricatures are both forms of visual arts created for satirical or humorous purposes; and they have closely related and very similar characteristics. “A cartoon is a form of two-dimensional illustrated visual art. While the specific definition has changed over time, modern usage refers to a typically non-realistic or semi-realistic drawing or painting intended for satire, caricature, or humor, or to the artistic style of such works. An artist who creates cartoons is called a cartoonist;” cartoons are often featured in print media (such as single-panel gag cartoons, syndicated comic strips, and editorial cartoons found in magazines and newspaper, as well as books as collection or reprints of newspaper cartoons); in addition, cartoons are heavily featured in animations, because of the stylistic similarities between comic strips and early animated movies, "cartoon" came to refer to animation (Wikipedia, 2012a).

“A caricature is a portrait that exaggerates or distorts the essence of a person, animal or object to create an easily identifiable visual likeness. In literature, a caricature is a description of a person using exaggeration of some characteristics and oversimplification of others. [...] According to the Indian Cartoonist S. Jithesh, a caricature is the satirical illustration of a person or a thing, but a cartoon is the satirical illustration of an idea. [...] Caricatures can be insulting or complimentary and can serve a political purpose or be drawn solely for entertainment. Caricatures of politicians are commonly used in editorial cartoons, while caricatures of movie stars are often found in entertainment magazines” (Wikipedia, 2012b). As shown in *Figures 1A* through *1E*, cartoon or caricature images include images of humans, of personified animals, both



Figure 1D. An example of an editorial cartoon (The Onion, 2012).



Figure 1E. Sketched cartoon animals, with exaggerated eyes, mouths and body shapes.

Digital Tools for the Creation of Cartoons and Caricatures

Traditionally, cartoons and caricatures are created with pens, pencils, markers, scratchboards, watercolor a variety of other tools and mediums. The introduction of modern digital software programs opens up a new horizon for the creation of cartoons and caricatures. “There have been efforts to produce caricatures automatically or semi-automatically using computer graphics techniques. For example, a system proposed by Akleman et al. provides warping tools specifically designed toward rapidly producing caricatures (Wikipedia, 2012b). At Fry’s Electronics Store in the City of Woodland Hills, California, a few software programs designed specifically for automatically creating caricatures have been found. They include Anime Studio Debut 7 (“Create Your Own Cartoons and Animations”) for \$39.99, Anime Studio Pro for \$149.99, Manga Studio Debut 4 (“The Standard in Manga and Comic Illustration”) for \$44.99, and Comic Creator for \$19.99.

A digital imaging program called Kai’s Power Goo and developed by MetaTools offers powerful tools for the distortion of digital imagery. As shown in Figure 2, Edward Locke’s “normal” and youthful image has been distorted or caricatured into humorous faces with diverse facial expressions, and with different ages. Similar tools are now available in Adobe Photoshop CS5. The **KPT Goo** filter could be used to produce freeform liquid distortion of whole or parts of an image, “effectively turning a bitmap image into a liquid that can be interactively smeared, smudged, twirled, and pinched with the range of tools on offer. The obvious use is to distort photographic portraits into caricatures” (Wikipedia, 2012c).

This Directed Study is exclusively intended to explore some basics tools and settings in Adobe Photoshop, a popular software program taught throughout most, if not all, digital art courses at college level in the United States. Many tools, such as Warp and Distort, could be used to transform normal digital images of humans, animals, objects and scenes into cartoon and caricature images, by the process of exaggerating differences from an average face of humans or animals, or by making certain parts thereof larger or smaller than normal.



Figure 2. Caricatures created out of Edward Locke's normal picture" with tools of Kai's Power Goo software program.

Part One:

Basic Sets of Photoshop Tools and Settings Used to Create Cartoon and Caricature-Style Images

Section One:

Using Image-Adjustments Tools to Change Color Tones in Digital Images

In order to create sensational visual effects, sharply contrastive color schemes and unusual color tones are often used (*Figures 3A and 3B*). To convert normal digital images into cartoon and caricature ones, tools and settings in Adobe Photoshop could be used to create smooth, gradually transitioned color tones in selected areas of the digital images, as illustrated in the step-by-step instructions for the mini-project included in this section, as shown in *Figures 4A through 7E*.



Figure 3A. Example of sharply contrasting lighting conditions in the two Monsters, Inc, 2 cartoon-looking animals, especially in the reflected light on the face of the monster on the left side (Source: <http://thecia.com.au/reviews/m/images/monsters-inc-1.jpg>)



Figure 3B. The unusual use of colors in the eyes and shaded portion of the head of the eagle create a sensational effect of anger and vigilance.



Figure 4A. The original Photoshop image.



Figure 4B. Using the Lasso tool to select the area for changing color tone with an approximately “correct” and free-flowing silhouette.

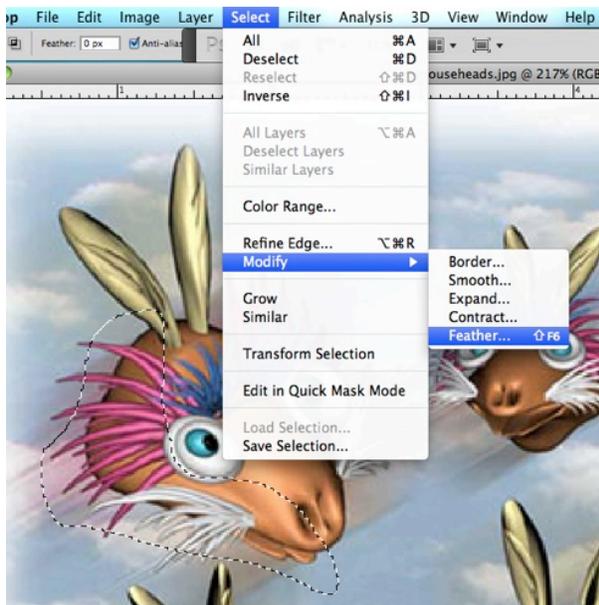


Figure 4C. Choosing the Feather tool under the Select menu.



Figure 4D. Applying a 10 pixel Feather to the selected silhouette.

As shown in *Figure 4A*, the original digital image is created as a collage of a digital photo of clouded sky and of several screen shots of a 3D cartoon animal created in 3D Studio MAX software. The separate images have been copied and pasted into a single Photoshop file; the layer containing the heads of the animal has been duplicated; the Motion Blur tool has been applied to the duplicated layer, after it has been arranged beneath the original layer in the Layer panel, to create a visual effect of wind and motion.

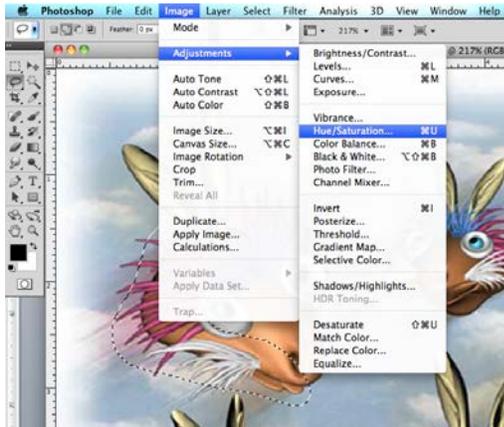


Figure 4E. Selecting the Hue/Saturation tool under the Adjustments submenu of the Image menu.

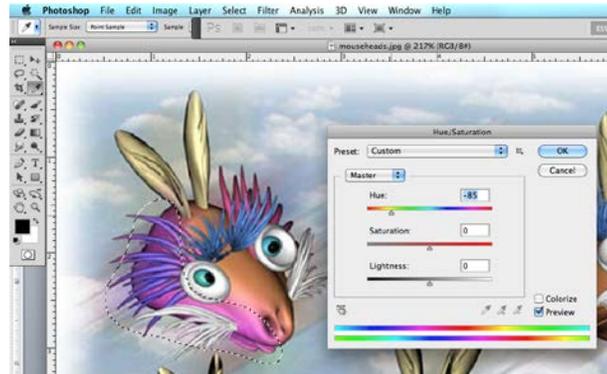


Figure 4F. Changing the Hue parameter by dragging the slider beneath the Hue bar.



Figure 4H. Using the Lasso tool to select a desired area and choosing the Feather tool from the Select menu.



Figure 4J. Applying a 10 pixel Feather.

Unit One: Using Lasso, Feather, and Image tools to edit the color tones of portions of image with gradual transition into neighboring area

The step-by-step procedures for changing the color tone of the shaded area of the head of the animal on the top left corner of the image are as follows:

1. Select the Lasso tool from the Tools panel, drag the mouse to select the area for changing color tone with an approximately “correct” and free-flowing silhouette (*Figure 4B*).
2. Choose the Feather tool under the Select menu (*Figure 4C*).
3. After the Feather tool window opens, type a number in the pixels text field to apply an amount for feathering of silhouette of the selected area; in this case, an amount of 10 pixels is used (the amount to use depends on situations; and sometimes, trial-and-errors are necessary to achieved a desired amount, which is indicated by the amount of shrinkage of the area after the OK button is pressed the Feather tool window closes). The Feather tool is used to avoid a sharp edge between the feathered area and the rest of the image, and to create a smooth graduation between the two areas (*Figure 4D*). The greater the amount, the smoother and farther the graduation.
4. Select the Hue/Saturation tool under the Adjustments submenu of the Image menu (*Figure 4E*).
5. After the Hue/Saturation tool window opens, drag the slider under the Hue stripe to select a desired Hue (*Figure 4F*). In Photoshop, this tool could be used to make a general or macroscopic change of the color tone of the image, before the Color Balance tool is used to further adjust the color tones of any particular area. If the same selected area needs to be further adjusted in color tones, then while the dotted selection outline (the “marching ants”) remains active, choose the Color Balance tool under the same Adjustments submenu of the Image menu, and apply desired changes after the Color Balance tool window opens. Otherwise, use the Lasso and Feather tools again to select a desired area for the application of Color Balance, Brightness/Contrast and other effects (*Figures 4G through 4N*).

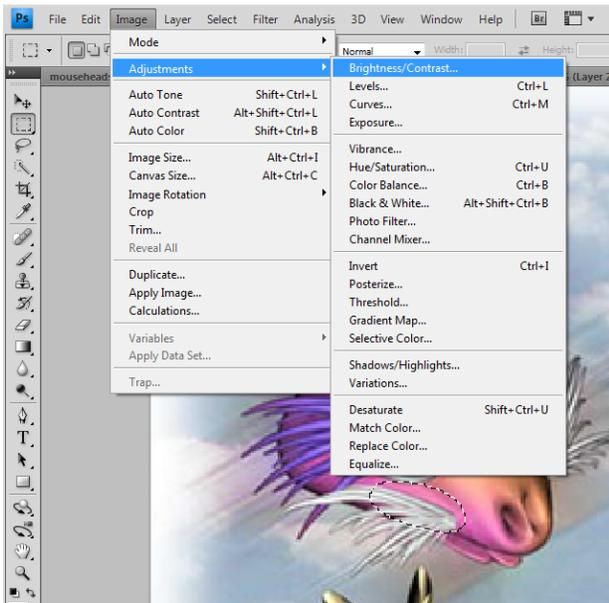


Figure 4K. Selecting the Brightness/Contrast tool under the Adjustments submenu of the Image menu.



Figure 4L. Dragging the sliders beneath the Brightness and Contrast bars to choose desired adjustments; pressing the OK button to apply the effects.

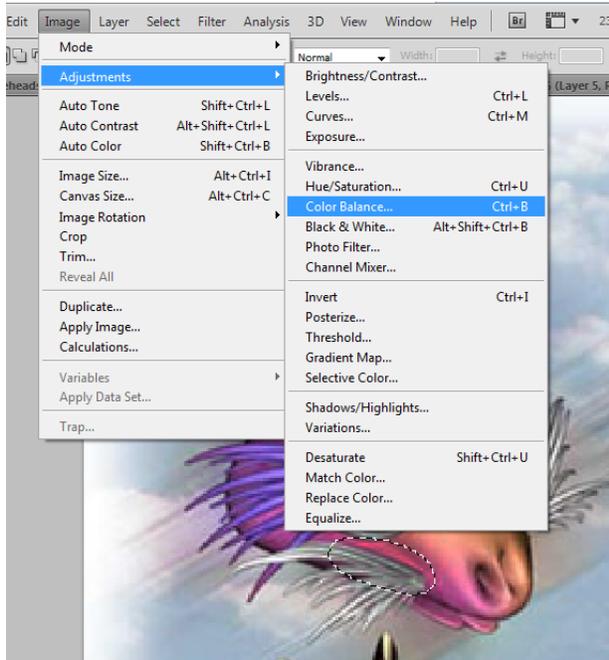


Figure 4M. Selecting the Color Balance tool under the Adjustments submenu of the Image menu while the “marching ants” of the selected area remains active.

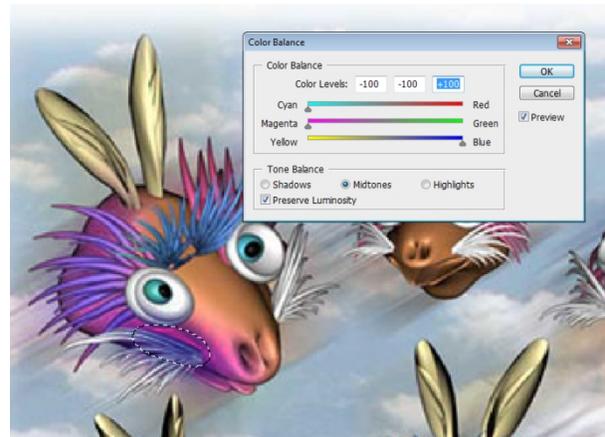


Figure 4N. Dragging the sliders beneath the Cyan/Red, Magenta/Green and Yellow/Blue bars to choose desired adjustments; pressing the OK button to apply the effects.

Using similar procedures as above, other portions of the image could be color-edited; and the appearance of the image so far is shown in *Figures 5A*.

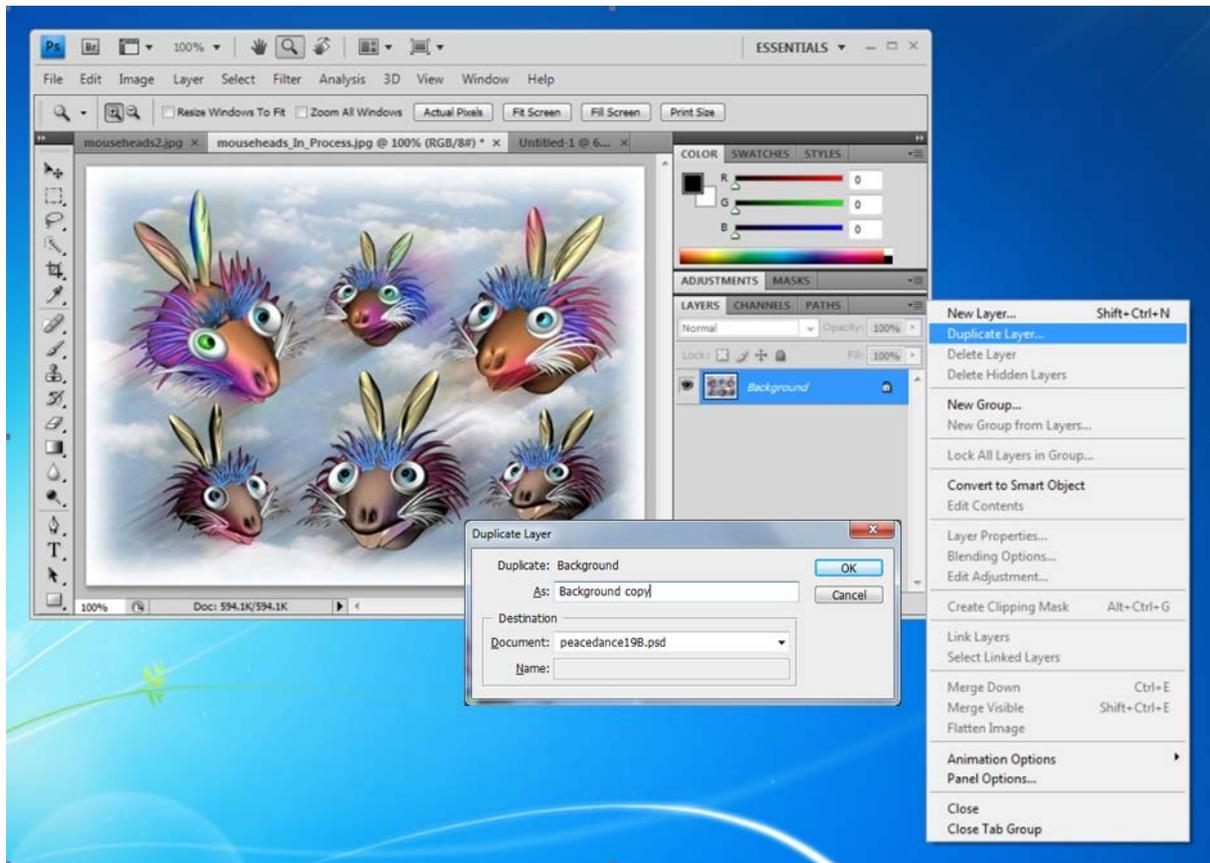


Figure 5A. Duplicating the original layer to prepare for the creation of portions of the image, which are to be color-edited and to have sharp edge on one side and blurred edge on the other side.

Using Layer, Pen and other tools to edit the color tones of portions of the image with sharp edge on one side and blurred edge on the other side

To create portions of the image, which are to be color-edited and to have sharp edge on one side and blurred edge on the other side, take the following steps:

1. Go to the Layer panel, right-click the inverted triangle on the right corner of the panel to open the pull-down menu; click-select the Duplicate Layer option; when the Duplicate Layer window appears on the screen, press the OK button to create a duplicate layer (*Figure 5A*);
2. Select the Hue/Saturation option under the Adjustments submenu of the Image menu; when the Hue/Saturation window opens, drag the slider beneath the Hue bar to change the Hue parameter; and click the OK button to apply (*Figures 5B and 5C*);
3. Select the Pen tool and draw the border of the area to be removed for the creation of the sharp edge on portions of the image (*Figure 5D*);
4. Select the Path panel, right-click on the triangle at the top-right corner of the panel to open the Path submenu; select the Make Selection option; when the Make selection window opens, accept the default 0 value in the pixels text field, and click the OK button to convert the path into a selection (*Figure 5E*);

5. Press the Delete key on the keyboard to remove the Path-selected area and create sharp edges on one side of the noses with color-tinting applied (*Figure 5F*).
6. Select the area to be removed for the creation of blurred edges on the other side of the noses with the Lasso tool (*Figure 5G*).
7. Apply a 15-pixel Feather effect on the selected area (the amount depends on the size of the image; trial-and-error is sometimes needed) (*Figure 5H*).
8. Press the Delete key on the keyboard once or several times if needed (*Figure 5J*).
9. Repeat the steps 6, 7 and 8 to the extra areas under the noses of the two selected animals and to create blurred edges (*Figures 5K, 5L, and 5M*); and repeat the same steps again to extra areas above the noses of the two selected animals and to create blurred edges (*Figures 5N and 5P*).

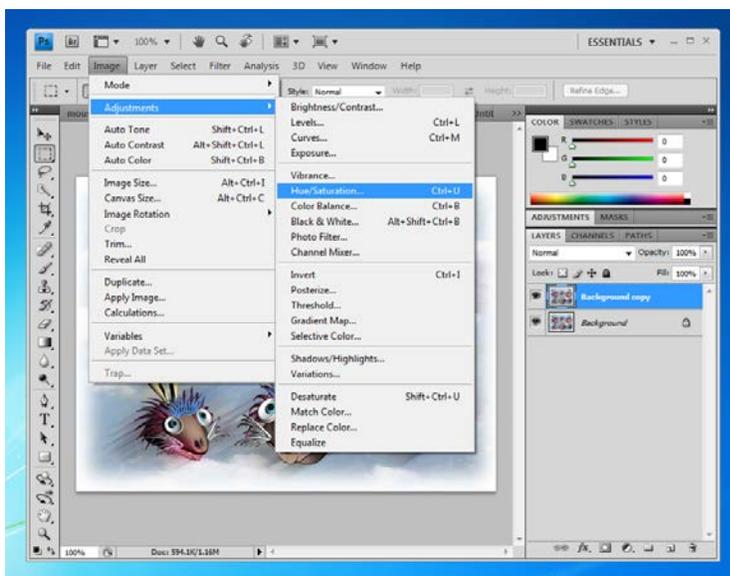


Figure 5B. Selecting the Hue/Saturation option under the Adjustments submenu of the Image menu.

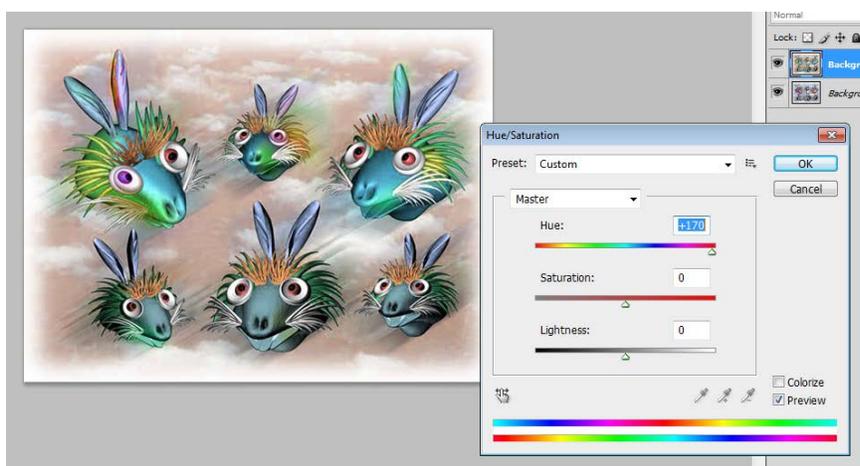


Figure 5C. Dragging the slider beneath the Hue bar to change the Hue parameter.

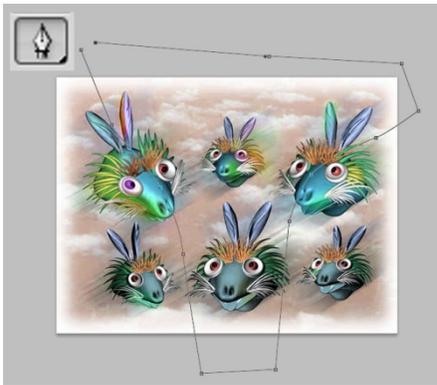


Figure 5D. Drawing the path of the area to be removed with the Pen tool.



Figure 5E. Changing the path into a selection.



Figure 5F. Pressing the Delete key on the keyboard to remove the Path-selected area (left) and create sharp edges on one side of the noses with color-tinting applied (right).



Figure 5G. Selecting the area to be removed for the creation of blurred edges on the other side of the noses with the Lasso tool.

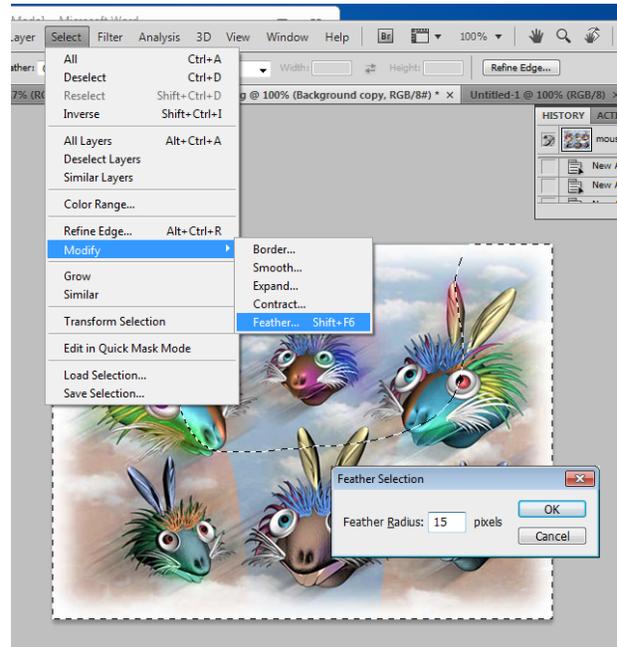


Figure 5H. Applying a 15-pixel Feather effect on the selected area (the amount depends on the size of the image; trial-and-error is sometimes needed).



Figure 5J. Pressing the Delete key on the keyboard once or several times if needed.

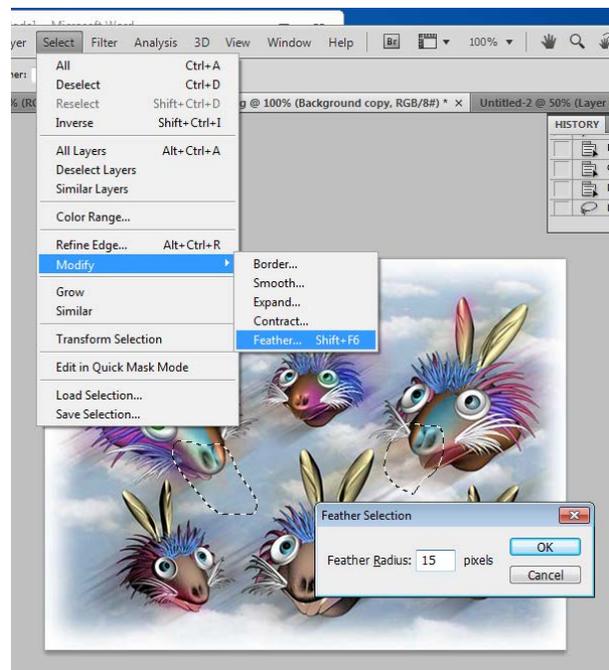


Figure 5K. Selecting the extra areas under the noses with the Lasso tool and applying a 15-pixel Feather.



Figure 5L. Pressing the Delete key on the keyboard to delete the extra areas and to create blurred edges.



Figure 5M. Right-clicking inside the Photoshop screen to open the Selection tool's contextual menu and clicking the Deselect option to remove the selection.



Figure 5N. Selecting the extra areas above the noses with the Lasso tool and applying a 15-pixel Feather.



Figure 5P. Pressing the Delete key on the keyboard to delete the extra areas and to create blurred edges.

Using Brightness/Contrast, Vibrance, Hue/Saturation and other tools to edit the color tones of selected portions of the image

Next, adjust the color tones of portions of the image (*Figures 6A through 7E*). In this mini-project, the following steps are used:

1. Use the Brightness/Contrast setting from the Adjustments submenu of the Image menu to brighten up the color tone of the duplicated layer (*Figure 6A*).

2. Use the Vibrance setting from the Adjustments submenu of the Image menu to brighten up the Vibrance parameter of the duplicated layer and make it “fresher” and “eye-catching” (Figure 6B).
3. Collapse the original and duplicated layers to create a single layer image for further color-editing (Figure 6C).
4. Use the Lasso and Feather Tools as well as the Hue/Saturation setting to change the Hue parameter of a selected area. (Figures 6D through 6G).

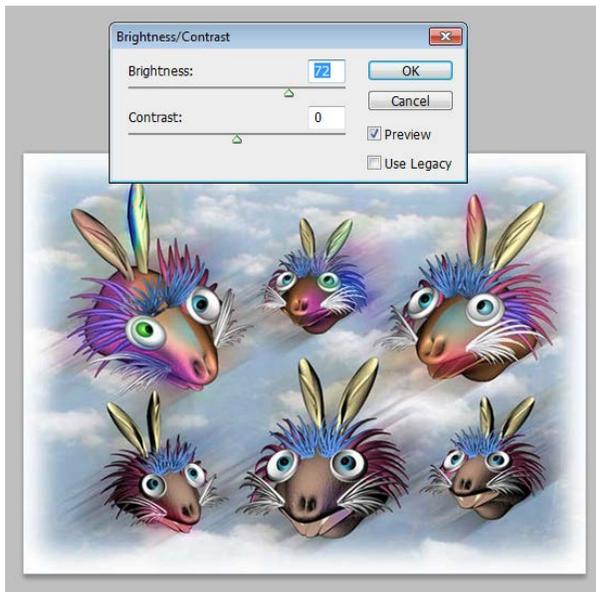


Figure 6A. Choosing the Brightness/Contrast option from the Adjustments submenu of the Image menu and dragging the slider under the Brightness scale bar to brighten up the color tone of the duplicated layer.

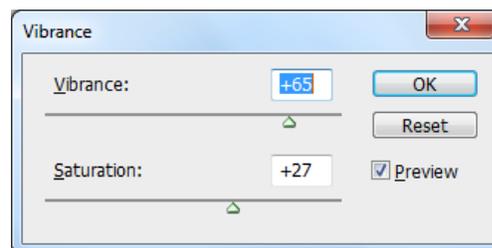
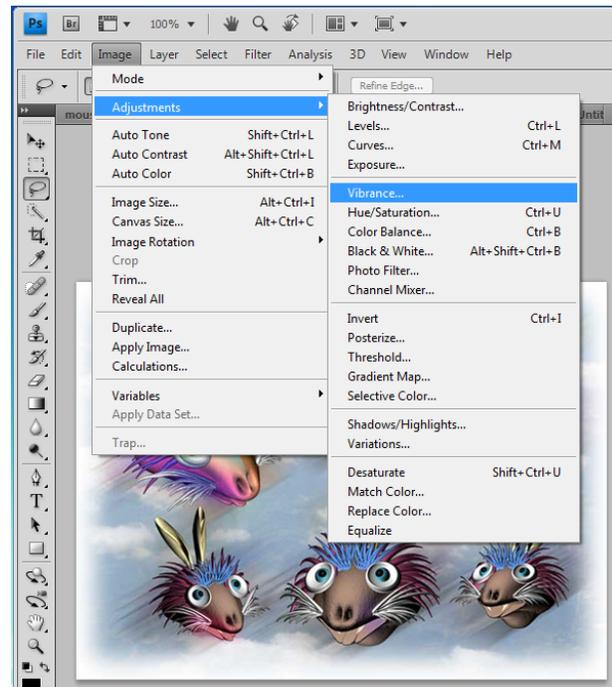


Figure 6B. Choosing the Vibrance option from the Adjustments submenu of the Image menu and dragging the slider under the Vibrance scale bar to brighten up the Vibrance parameter of the duplicated layer and make it “fresher” and “eye-catching.”



Figure 6C. Collapsing the original and duplicated layers by clicking inverted triangle at the right corner of the Layer panel to open up the option menu and to choose the Flatten Image option (left), creating the single layer image for further color-editing (right).



Figure 6D. Selecting the top area of the entire image with the Lasso tool for further color-editing.

Figure 6E. Applying a 30-pixel Feather effect (the amount of Feather depends on the breadth of the gradation desired; the greater the amount, smoother the transition and the broader the span of color tone transition will be).



Figure 6F. The edge of the selection “smoothed-off” by the effect of Feather.

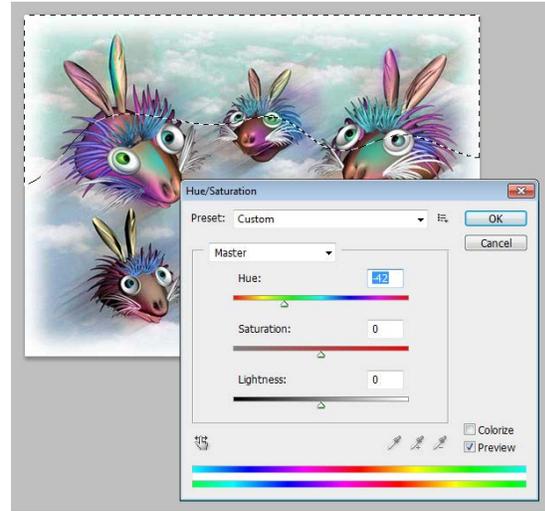


Figure 6G. Selecting the Hue/Saturation tool from the Adjustments submenu of the Image menu, and changing the Hue parameter of the selected area.

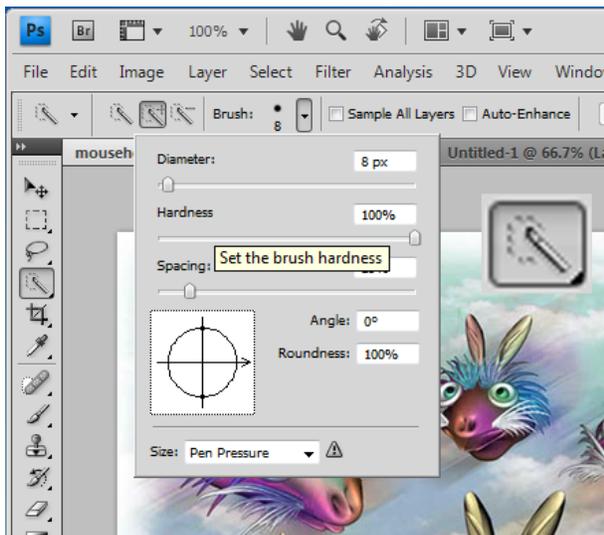


Figure 7A. Selecting the Quick Selection tool and changing the Diameter and Hardness of the tool in the Brush menu.



Figure 7B. Clicking inside the left half of the right ear (left) to select it, and then the right half of the right ear to add it to the selection.



Figure 7C. Adding the left year to the selection and applying a 5-pixel Feather.

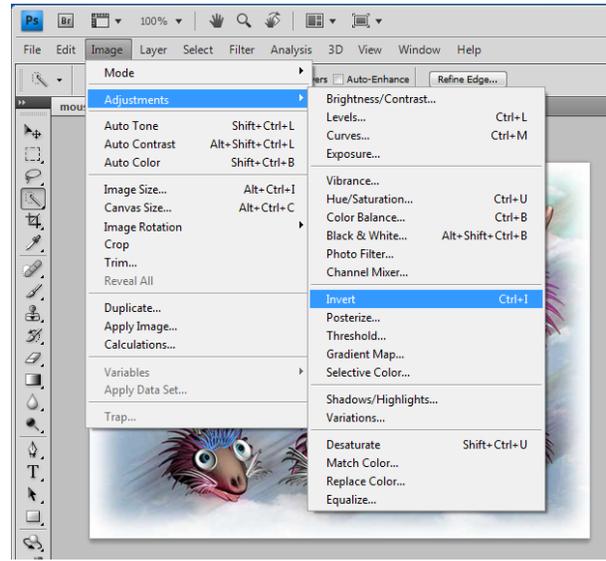


Figure 7D. Changing the color tone of the ears by choosing the Invert option from the Adjustments submenu of the Image menu.

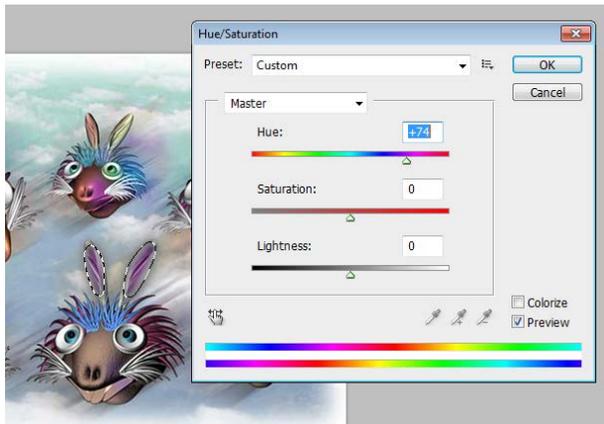


Figure 7E. Adjusting the Hue of the inverted color tone with the Hue/Saturation tool from the Adjustments submenu of the Image menu.

Finally, as the last tool to be tried in this Section, the Quick Selection Tool will be used. The Quick Selection Tool allows the selection of the whole area with similar color tones and shades. The steps are as follows:

1. Use the Quick Selection and Feather Tools to select a pair of ears (Figure 7A through Figure 7C).
2. Change the color tone of the ears with the Invert Tool from the Adjustments submenu of the Image menu (Figure 7D).
3. Adjust the Hue of the inverted color tone with the Hue/Saturation tool from the Adjustments submenu of the Image menu (Figure 7E).

Section Two: Using Edit-Transform Tools to Change Normal Digital Images into Caricature or Cartoons

In this Section, Warp, Distort, Perspective, Skew and Other Tools available from the Transform submenu of the Edit menu, as well as different tools from the Liquify option of the Filter menu will be explored in terms of their abilities to transform normal images into cartoon or caricatures.

Using the Warp Tool to transform portions of or the whole normal images into cartoon or caricatures

The steps for using the Warp Tool are as follows:

1. Select the desired area with the Rectangular Marquee Tool (*Figure 8A*).
2. Select the Warp tool from the Transform submenu of the edit menu (*Figures 8B and 8C*).
3. Drag the edges and their intersecting points inside the warping grid to achieve the desired effects, (*Figure 8D*).
4. Use the same steps as in step 1 through 3 to apply Warp effects to other portions of the image. (*Figures 8E through 8L*).



Figure 8A. Selecting the desired area with the Rectangular Marquee tool.

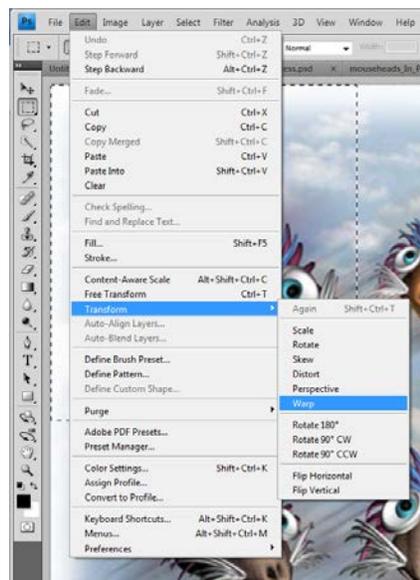


Figure 8B. Selecting the Warp tool from the Transform submenu of the edit menu.



Figure 8C. The Warp grid with handles (black square), points of intersection and horizontal and vertical edges.



Figure 8D. Dragging the horizontal edges, vertical edges and their intersecting points inside the warping grid to achieve the desired effects, clicking on the screen to open up the tool window and clicking the Apply button to complete the Warp operation (left); using the Rectangle tool again to drag-select another area for Warp operation (middle). To maintain smooth connection of the portions of the image inside and outside the Warp grid, do not drag the handles or edges on the perimeters of the grid. Generally speaking do NOT drag the edges or intersecting points inside the grid beyond the outside perimeter of the Warp grid, otherwise, portions of the image will be lost (right).



Figure 8E. Selecting another portion of the image for Warp operation; dragging the edges, vertical edges and their intersecting points to achieve the desired effects, clicking on the screen to open up the tool window and clicking the Apply button to complete the Warp operation.



Figure 8F. Selecting both ears of this mouse with the Rectangular Marquee tool.



Figure 8G. Applying another Warp effect with the same Warp tool.



Figure 8H. The outcome of the Warp operation.



Figure 8J. Selecting another mouse for Warp operation.

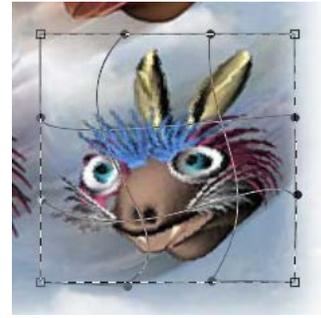


Figure 8K. Applying a Warp effect.



Figure 8L. The outcome after the Warp operations.

Section Three: Using Filter-Liquify Tools to Change Normal Digital Images into Caricature or Cartoons

The tools to be used in this mini-project include Forward Warp Tool (W), Bloat Tool (B), Pucker Tool (S), Twirl Clockwise Tool (C), Push Left Tool (O), Mirror Tool (M), and Turbulence Tool (T).

Explanations of the capabilities of these Tools and of their related settings are as follows:

The Tools to be used (*Figure 9A*),

- Forward Warp Tool (W) pushes pixels forward as the mouse is dragged in desired directions. This tool could be used to extend the length of a selected object or to add a branch off the edge of a selected object by dragging the mouse off a selected point on its edge.
- Reconstruct Tool (R) reverses the distortion that has been already added, as the mouse button is held down and dragged on the area where the distortion has been added. This tool is equivalent to the Undo tool available in many software programs.
- Twirl Clockwise Tool (C) rotates pixels clockwise as the mouse button is held down and dragged. To twirl pixels counterclockwise, hold down Alt (Windows) or Option (Mac OS) as the mouse button is held down and dragged. The effects of using this tool is fairly similar to those of using the Twirl Tool from the Distort submenu of the Filter menu, except that the later includes a tool window with adjustable gridded map (*Figure 10P*).
- Pucker Tool (S) moves pixels toward the center of the brush area as the mouse button is held down and dragged, and decreases the size of the portion of the image around the point being clicked by the mouse button.
- Bloat Tool (B) moves pixels away from the center of the brush area as the mouse button is held down and dragged, and increases the size of the portion of the image around the point being clicked by the mouse button.
- Push Left Tool (O) moves pixels to the left when the mouse button is dragged straight up (pixels move to the right if it is dragged down). The mouse button could also be dragged clockwise around an object to increase its size, or counterclockwise to decrease its size. To push pixels in the opposite direction when dragging the mouse button, hold down Alt (Windows) or Option (Mac OS).
- Mirror Tool (M) copies pixels to the brush area by dragging the mouse button to mirror the area perpendicular to the direction of the stroke (to the left of the stroke). Alt-drag (Windows) or Option-drag (Mac OS) to mirror the area in the direction opposite to that of the stroke (for example, the area above a downward stroke).
- Turbulence Tool (T) smoothly scrambles pixels. It could be used to create ocean waves, fire flames, sky clouds, and other similar effects.

The tool options to be used (*Figure 9A*),

- Brush Size sets the width of the brush used to distort portions of the image.
- Brush Pressure sets the speed at which distortions are made when the mouse button is dragged. Using a low brush pressure allows changes to take place more slowly, and makes it easier to stop the changes at exactly the right moment.

- Brush Rate sets the speed at which distortions are applied. The higher the setting, the greater the speed at which distortions are applied.

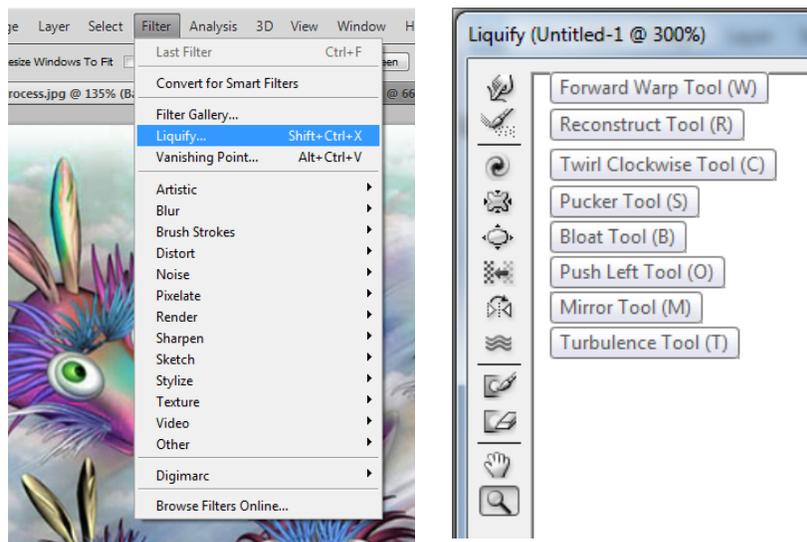


Figure 9A. Selecting the Liquify tool from the Filter menu (left). The Liquify tool's window (top), with tool to be used in this mini-project (right), and settings for the tools (on the right side panel of the window, top).

- Brush Density controls how a brush feathers at the edge from the center of the brush where the effect is strongest.
- Turbulent Jitter determines how tightly the Turbulence tool scrambles pixels.

- Reconstruct Mode is used for the Reconstruct tool to choose the mode for the tool to reconstruct an area of the preview image.
- Stylus Pressure uses pressure readings from a stylus tablet (available only when working with a stylus tablet).

To access these Tools, first go to the Filter menu and choose the Liquify option to open up the Liquify tool window (*Figure 9A*).

The steps for using the Forward Warp Tool (W) are as follows:

1. Select the Forward Warp Tool (W) from the Liquify tool set (*Figure 9A*).
2. Use the Forward Warp Tool (W) to “smooth off” the gaps caused by previous Warp operations between the selected area and the surrounding area (*Figure 9B*).
3. Drag the mouse from a point on the edges of the selected components of the image to create branches or to extend the branches in different directions, straight or curved (*Figures 9C and 9D*).

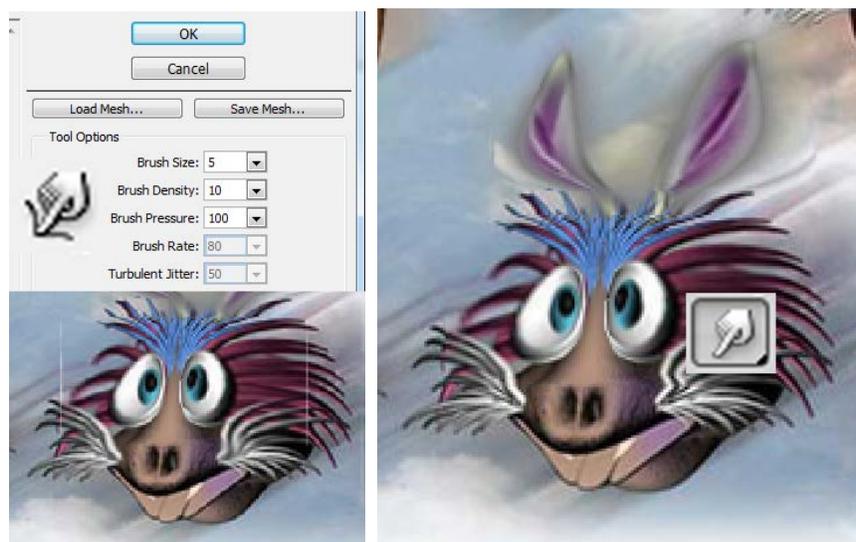


Figure 9B. Gaps caused by previous Warp operation between the selected area and the surrounding area could be “smoothed-off” with the Smudge Tool (left) or the Forward Warp Tool (right).

The Bloat Tool (B) is used to increase the size of the selected portion of the image. The steps for using the Bloat Tool (B) are as follows:

1. Select the Bloat Tool (B) from the Liquify tool set (*Figure 9E*).
2. Set the *Brush Size* set at a desired value, and click on an intended portion of the image to increase its size (*Figure 9F*).
3. Click at the center of an intended portion of the image and drag the mouse outward to change the shape of the portion (*Figure 9G*).

The Pucker Tool (S) is used to decrease the size of the selected portion of the image. The effects of using the Pucker Tool (S) are basically opposite those of using the Bloat Tool (B). The steps for using the Pucker Tool (S) are as follows:

1. Select the Pucker Tool (S) from the Liquify tool set, set the Brush size at a desired value (*Figure 9H*).
2. Click at the center of the intended portion of the image to achieve the effect shown (*Figure 9J*).

3. Click at the center of the intended portion and drag the mouse inward to change the shape.
4. Use the Pucker Tool to add indents to the intended portion of the image (*Figure 9L*).
5. Use the Pucker Tool to transform a relatively smooth object into more curvilinear forms (*Figure 9M*).



Figure 9C. Selecting the Forward Warp Tool (W) and dragging the mouse from a point on the edge of the ear outward to create a branch.

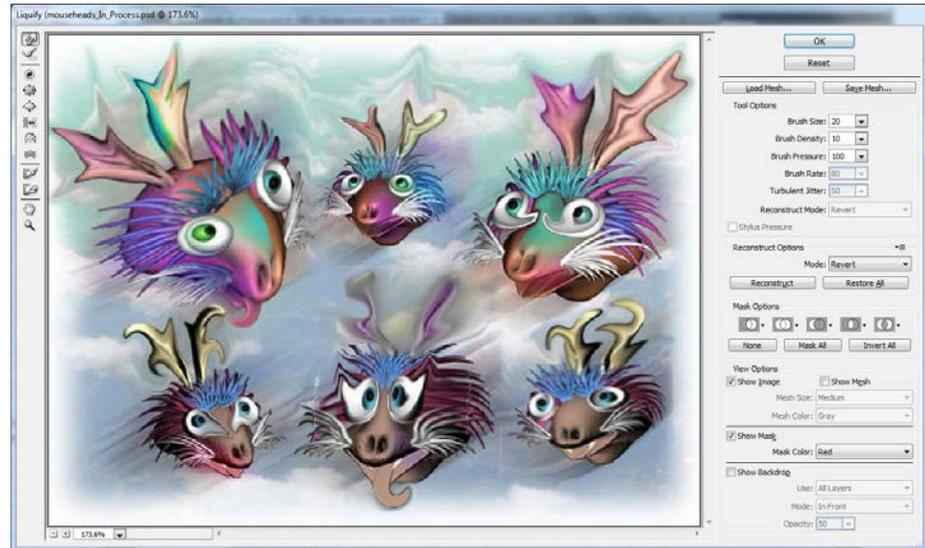


Figure 9D. Using the same Forward Warp Tool (W) and mouse-dragging action to create many branches on the ears of all of the animals and on the tangs of the top-left and bottom-middle animals.



Figure 9E. Selecting the Bloat Tool (B) with the Brush Size set at 50, and clicking five times on the black iris of the right eye to increase its size.



Figure 9F. Using the same Bloat Tool (B) but with the Brush Size set at 100, and clicking five times on the black iris of the right eye to increase its size. Greater Brush Size will select larger area around the point clicked by the mouse as the target for Bloat operation.



Figure 9G. Clicking at the center of the right-side branch of the right ear and dragging the mouse outward will change the shape of the branch. Try dragging to different direction to see various effects.



Figure 9H. Selecting the Pucker Tool (S) to decrease the size of the area around the point being clicked by the mouse button. Setting the Brush size at 50 and clicking five times at the center of the black iris of the left eye to achieve the effect shown.



Figure 9J. Using the Pucker Tool, the mouse button is held and dragged over the nose of the animal to slightly decrease its size,



Figure 9K. Using the Pucker Tool (S) and setting the Brush size at 50 and clicking five times at the center of the black iris of the left eye to achieve the effect shown. The larger the Brush size, the larger of area affected by the clicking action.



Figure 9L. Using the Pucker Tool and clicking at the center of the left ear trunk could add indents to the trunk.

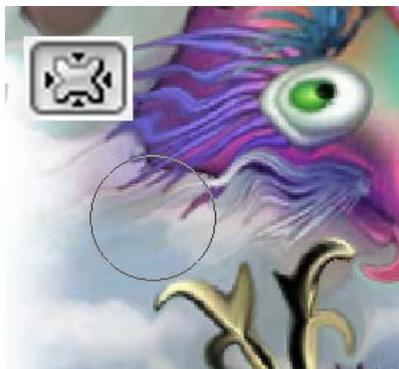


Figure 9M. Using the Pucker Tool, clicking at a selected point and dragging the mouse button along a curved path to transform the relatively smooth hairs into more curvilinear forms.

Using Warp Tool and Pucker Tool again to change portions of or the whole normal images into cartoon or caricatures

After The Warp Tool from the Transform submenu of the Edit menu, menu various tools from the Liquify submenu of the Filter menu have been used to change many parts of the entire image into cartoon-looking image, in the previous operations, the same tools are to be used again to further transform the imagery, creating different cartoon-style effects. As show in *Figures 10A through 10F*, the Warp tool is used again to change the overall compositions of the heads of the animals. As shown in *Figures 10G through 10K*, the Pucker Tool is used to curl up the relatively rectilinear or slightly curved hair of the heads of the animals into more curvilinear forms with sharp turns and twists, or to elongate the hairs.



Figure 10A. Using the Rectangular Marquee Tool to select the desired area.



Figure 10B. Selecting the Warp Tool from the Transform submenu of the Edit menu and dragging the edges and points to change the image.



Figure 10C. The outcome.

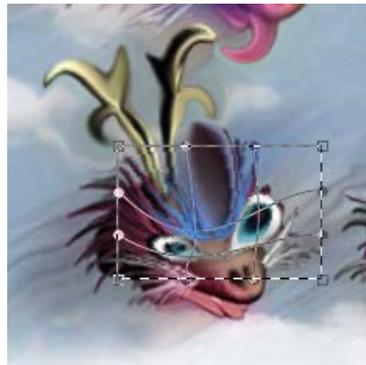


Figure 10D. Same Warp operation on another portion of the image.

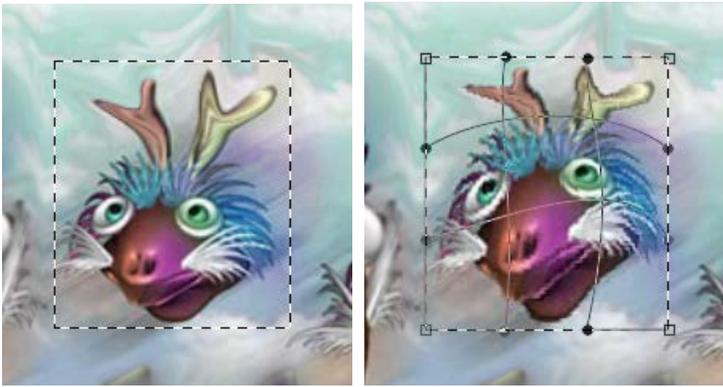


Figure 10E. Same Warp operation on another portion of the image.



Figure 10F. The outcome of the Warp operation so far.



Figure 10G. Using Pucker Tool to change the direction of the hair in the top-right animal.



Figure 10H. The outcome of all previous operations so far, after using the Pucker Tool and the Warp operations to change the shape of the animal head and the orientation of the hair style of the animal.



Figure 10J. Curling up the hair on the right hand side of the animal in the middle of the bottom row, with the pucker Tool, dragging the mouse button in the circular direction.



Figure 10K. Elongating the blue hair on central portion of the animal's front head in the middle of the bottom row, with the pucker Tool, dragging the mouse button vertically.