bioMorphUser Manual



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**Application Objective**

The objective of bioMorph is to loosely mimic the concept of natural selection found in any given ecosystem, whereby an organism reproduces and creates children with slightly modified genetic makeups. It is designed to allow you, its user, full control over the surviving organisms, and to display the evolutionary changes throughout the passing generations.

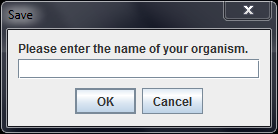
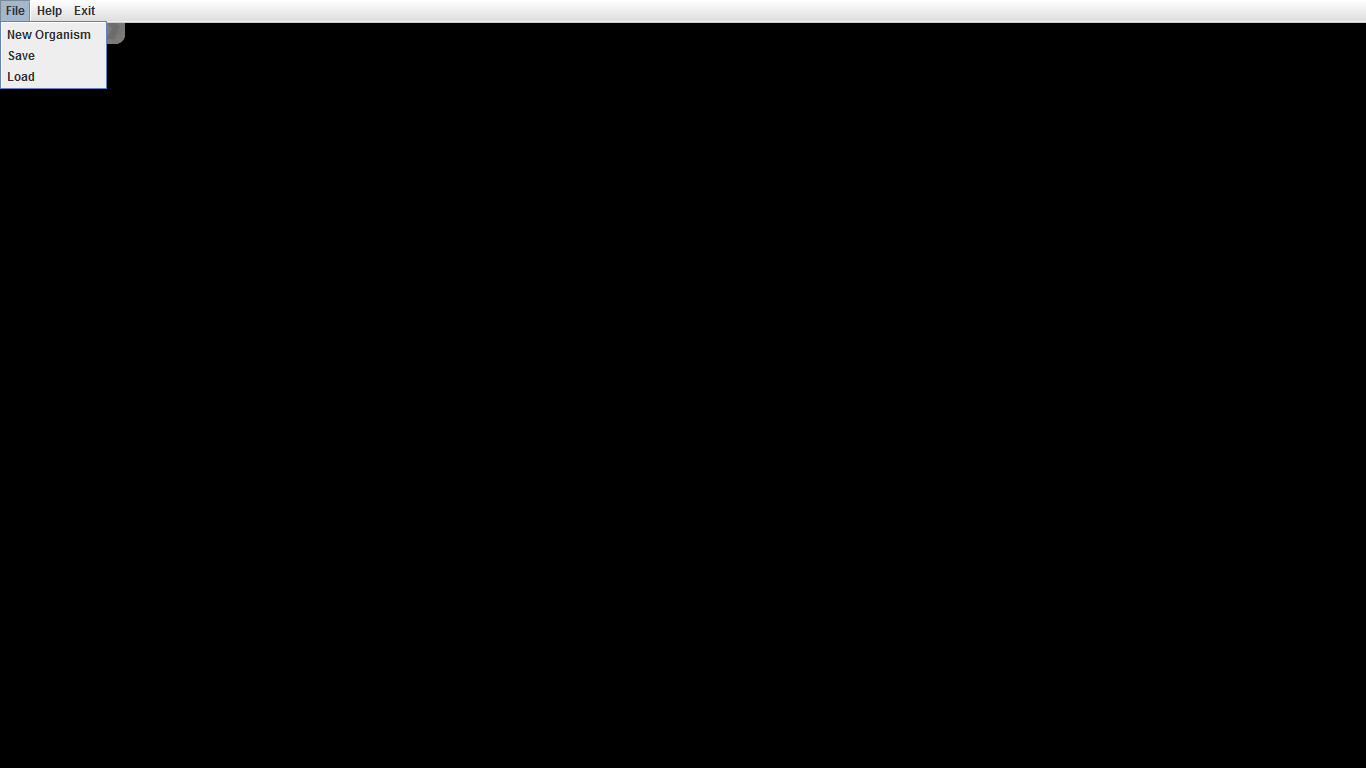
**Equipment Required**

You will require a monitor to view the screen and within it, its visuals, a keyboard to enter all necessary input, a mouse/keypad to select and click buttons, and sufﬁcient RAM and hard disk drive space depending on how long you wish to use the application for, and what organisms/genetic information from it you wish to save for future revising.

**Roles in Using the Application**

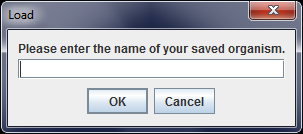
The computer will do most of the heavy lifting in bioMorph to prepare the screen and create the changing organisms; your role however, will be the most exciting! Within the application, you will act as “The Decider”. Once presented with the choice between children organisms, it will be your task to select the one that will survive, and thus inversely the ones that will not. Once you have done this, the computer will display that organism on the screen and give you a series of clickable options that you may select as you please.

**Using the Application**

When the application is run, the first screen displayed will be that of the default parent organism. Atop the screen you will find a menu bar with clickable buttons: “File”, “Help”, and “Exit”. Hovering over “File” will reveal a small drop-down menu of button options: “New Organism”, “Save”, and “Load”. Clicking “New Organism” will display the beginning screen with the default parent organism.

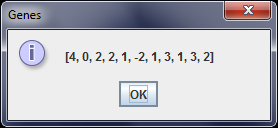
Clicking “Save” will prompt you to enter a name for the current parent organism you wish to save and will then allow you to save said organism under its given name.

Clicking “Load” will prompt you to enter the name of an organism you have previously saved and this will then be displayed on the screen.

Hovering over “Help” and clicking “Instructions” will show instructions to navigate the application. Finally, hovering over “Exit” and clicking “Close” will end the application.

As mentioned above, the first screen will display the default parent organism, as well as a three buttons below it. These are: “Reproduce”, “View Genes”, and “Animation”.

Clicking “Reproduce” will generate three children with slight mutations from its parents. It is important to note that in the younger generations of the organism, the mutations might not be visible to you. However, as the organism grows more complex, the mutations will become very evident and you will see all sorts of patterns created. These three children are clickable, and once you select one of them, it will survive. Once you have made your selection, the organism you chose will be displayed, once again with the three buttons below it.

Clicking “View Genes” will outline in a small window the genetic makeup of the current parent organism. This makeup will be a series of 11 numbers (genes and their functions can be found in the following section) that may be positive or negative depending on their function and visual effect.

Finally, clicking “Animation” will display the images of the ancestors of the current parent organism in quick succession. These ancestors will be the children you selected to survive from each generation. While the animation is running, you may click anywhere on the screen to stop it and return to the current parent.

By scrolling with the mouse wheel or a mousepad, you will be able to resize the organism displayed on the screen. You will be able to shrink them in case they become too large within their assigned space on the screen. You will also be able to enlarge them in order to explore their intricate designs more closely.

**Genes and Their Functions**

bioMorph includes 11 genes in the creation of its organisms, each with a different function and visual effect on the finished image. The three main defining factors of each organism are: depth, shape, and aesthetics.

Depth

The first gene or gene 1 controls the depth of the organism, meaning how many levels down its branches go. The depth of any given organism must have a value of at least one, so the organism will always be visible on screen.

Shape

The second through to the ninth gene are in charge of translating the branches to create different shapes. The second gene or gene 2 vertically translates every right branch found on even levels (levels of even depths). The third gene or gene 3 horizontally translates every right branch found on even levels. The fourth gene or gene 4 vertically translates every right branch found on odd levels. The fifth gene or gene 5 horizontally translates every right branch found on odd levels. The sixth gene or gene 6 vertically translates every left branch found on even levels. The seventh gene or gene 7 horizontally translates every left branch found on even levels. The eighth gene or gene 8 vertically translates every left branch found on odd levels. Finally, the ninth gene or gene 9 horizontally translates every left branch found on odd levels.

The following table summarizes the above information.

|  |  |
| --- | --- |
| **Gene** | **Effect** |
| 2 | Vertical Translation - Right Branches, Even Levels |
| 3 | Horizontal Translation - Right Branches, Even Levels |
| 4 | Vertical Translation - Right Branches, Odd Levels |
| 5 | Horizontal Translation - Right Branches, Odd Levels |
| 6 | Vertical Translation - Left Branches, Even Levels |
| 7 | Horizontal Translation - Left Branches, Even Levels |
| 8 | Vertical Translation - Left Branches, Odd Levels |
| 9 | Horizontal Translation - Left Branches, Odd Levels |

Aesthetics

The tenth and eleventh gene deal with the overall visual aesthetic of the organism. The tenth gene or gene 10 controls the color of the organism, and it is in charge of creating the colorful patterns found in the final image. Lastly, the eleventh gene or gene 11 controls the thickness of the branches that make up the organism.

**FAQ**

1) Why is the starting parent organism always the same?  
This is because we want to begin the evolutionary process from a very basic and rudimentary organism. Although the starting parent will always be the same, as it reproduces and its children reproduce, you will create plenty of different genetic combinations, and thus unique organisms.

2) My organisms are very big and are growing out of the screen. How can I see them better?  
As we mentioned above, by scrolling with the mouse wheel or mousepad you will be able to shrink or enlarge the organism displayed on this screen. This will allow you to size them as you wish.

3) If I save an organism and I close the application, will my organism be remembered?  
Yes. The application will save all the information pertaining to the organism you saved even once it is closed. All you must do is remember the exact name under which you saved it, and next time you open the application simply load it in and enjoy.

4) Once I load an organism, will I be able to see its succession tree through the animation?  
Yes. Once you instruct the application to save a given organism, it not only saves the information for that specific organism, but also that of its ancestors. Therefore, if you decide to load it and view its animated succession tree, you will certainly be able to.

5) What are some example organisms that could be created?

|  |  |  |
| --- | --- | --- |
| The Stick Man | The ‘A’ | The Insect |
| https://scontent-ord1-1.xx.fbcdn.net/hphotos-xpt1/v/t35.0-12/11297001_1065240043490619_927910311_o.jpg?oh=90cea703ea15f105c768be21c52fff95&oe=5564F471 | https://scontent-ord1-1.xx.fbcdn.net/hphotos-xta1/v/t34.0-12/11271234_882376428467768_315415158_n.jpg?oh=20542f4894f166f008445896411d95dc&oe=5564B8E7 | https://scontent-ord1-1.xx.fbcdn.net/hphotos-xpf1/v/t35.0-12/11041446_1065243013490322_5090454930241628303_o.jpg?oh=c49ceca9e99fe7952e6022f6f30835ef&oe=5565008E |

6) How will I know what generation the current parent organism is?  
The current generation number will be displayed on screen for you to be able to see at all times.

**Glossary**

bioMorph (Pages 3, 5) - This is the name of the application. When referring to bioMorph, we are referring to it in its entirety.

Gene(s) (Pages 4, 5, 6) - Within the context of the bioMorph (see definition above), genes are traits found within any given organism that contain specific values indicating certain effects on its appearance. For a detailed explanation of the function of each gene within an organism, please see the Genes and Their Functions section of this manual.

Hard Disk Drive (Page 3) - In a personal computer, a hard disk drive (HDD) is the mechanism that controls the positioning, reading, and writing of the hard disk, which furnishes the largest amount of data storage for the PC.   
\*Definition obtained from: Search Storage TechTarget  
http://searchstorage.techtarget.com/definition/hard-disk-drive

Menu Bar (Page 3) - The menu bar in bioMorph can be located at the very top of the screen running horizontal across the full width of the monitor. It contains the meu options that are available for you to click throughout your use of the application. For a detailed explanation of the specific functions of the menu bar, please see the Using the Application section of this manual.

RAM (Page 3) - RAM or Random-Access Storage is one type of data storage used in computers. This type of memory is used to store running programs and their data. However, all the information stored in RAM is lost when the computer is turned off.

Succession Tree (Page 6) - This refers to the ancestral tree of a given organism; meaning all the ancestors that came before it. In bioMorph, an organism’s succession tree is displayed as a small and quick animation, showing the changing organism over its past generations until it arrives at present time.