The original GUI library for Java was AWT also known as Abstract Window Toolkit. It provided the original windowing, graphics and UI widget toolkit. It is a part of the Java Foundation Classes which is the API for the GUI. One of the areas that the AWT GUI has some advantages is in many non-desktop environments. It can take up less memory, have better response times due to being a local component that is rendered in the OS, and it is mature and stable. A common downside is that there is a lack of rich component features.

Swing is the successor to AWT and is built on AWT. It was created as a way to help mitigate some of the short comings as do most updates. Swing is still part of the Java Foundation Classes and it completely written in Java. It had the aim of support of a “pluggable look and feel [that] allowed Swing components to emulate the appearance of native components while still retaining the benefits of platform independence.” (Wikipedia) Some of the core benefits are the rich component features, standard GUI library and it scalable and flexible. One of the downsides to swing as that with more robustness, there are more issues with memory consumption.

JavaFX was originally named F3 (Form Follow Function). It is the successor to Swing although it did not replace Swing as it was intended to do. It This largely has to do with the mobile first and web first design that has boomed. The JavaFX Library is available as an API that is public form Java. It was created to streamline GUIs and create an even more robust application. Some of the unique features are that it provides a rich set of multimedia support and one can embed web content. It is built of a scene graph which is a collection of visual elements that are called nodes. These nodes help to better handle user inputs and gestures. One of the major cons of working with JavaFX is that it was not truly built until Java 8 so there can be clashes with Java 7 and earlier.

JavaFX is currently supported in Windows Vista, Windows 7, Windows 8, Windows 10, macOS and Linux Operating Systems.