The Possible Future of XQC Software:
A Brief Survey of Software Components and Possible Courses of Action

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Introduction

XQC software currently is written in C. The current implementation of the graphics within the software uses a series of X11 library calls which are no longer fully supported. Additionally, it may use xview, which is an abandoned toolkit. The combination of these two factors causes the XQC software to only run properly on a Solaris computer. XQC includes several necessary features. A user must be able to read data into the program and have the ability to mark parameters (pressure, dew point, temperature, portion of the wind profile) as either good, bad, or questionable. The software displays a skew-t and log-p diagram alongside a wind profile. The user is also able to write the altered data to another file, clear the data, and read in the original data set. He can switch to the next or previous data set and zoom (or unzoom) into the graph. The XQC software is also supposed to allow the user to select a location by the first three letters of the site's name, but this feature is not currently functional. There is also apparently a separate software, XQC2, which displays the skew-t log-p over a white background instead of a black one.

Future Considerations

Future versions of the software should include many of the same features, but must also include a way to change the marking of bad data, the ability to highlight the interpolated data, and a white background. A drag-and-drop zoom feature, a wind plot instead of a wind profile, the ability to save an image of a skew-t plot, and a display of ascent rate are also desired features in the new version. The ability to overlay multiple soundings is also a requested feature, but that might be better addressed with a separate software.

Similar Software

Some similar software programs already exist. The Army's ASP software displays a skew-t log-p graph. It, like XQC, is written in C , but it has built-in quality control instead of manual markers. It analyzes pressure, temperature, humidity and wind structure (“The Atmospheric Sounding Program”). Colorado State University came out with a similar program developed in Tcl, but it's look-and-feel, as well as basic functionality, are different than what is desired for this project. ASPEN, another similar software developed by NCAR and used by both NCAR and NASA, creates a skew-t log-p graph, but requires a different file-type and does not allow for the quality control markers used in XQC (“ASPEN User Manual”). NOAA has an online Java program which allows a user to import data from a variety of

sources at different times and generate plots. It makes a skew-t log-p graph and a wind profile, but, once again, quality control markers cannot be entered on the data (that is not the purpose of this software). This program, however, also displays a wind plot in addition to the profile, and an overhead view of the wind gradient ("Generate soundings from RUC"). RAOB software can analyze a large variety of types of data, but it does not allow for quality control markers (RAOB).

Possible Solutions

There are several possible ways to create a new version of the XQC software. The first would be updating the current code from C to C# ("Converting from C (not C++) to C#"). A tool such as Mono could be used to aid this transition and allow for cross-platform compatibility. This could allow the new software to be run on a variety of systems, and continue to run on future operating systems ("Mono"). However, this method requires a large amount of code revision.

Another strategy to create the new XQC software would be to completely rewrite the software. This makes a lot of sense since there are some distinct changes between the old and new software. One language that could be used to do this is Java. Java is cross-platform compatible, well supported, and commonly used. It can easily be created into an executable software ("Language Comparison: Sheet1"). The existence of the NOAA online Java program demonstrates that quality skew-t log-p diagrams can be created in Java (even though the new software will not be web-based like NOAA's).

The completely rewritten software could also be written in Python. Python has a large number of cross-platform frameworks and GUI design tools. It is also a syntactically simpler language than Java ("GUI Programming in Python"). Still, its look-and-feel are less well-known and it lacks IDEs on-par with the ones for Java.

Final Recommendation

Overall, the best option is probably Java. Based on discussions with Steve Sullivan and Don Stott, the Python add-ons necessary to make GUIs are difficult to install and can be troublesome. Java is a proven solution which is well-known and reliable. Also, the conversion from C to Java is not terrible because the two languages are syntactically similar. The new software should be written in Java.

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