AAVSO Software Developer's Guide
Latest version: 15 August 2018

1. Greetings

We're so glad to have you write software for us!

Your program may be in use for decades, and likely beyond your own period of involvement with AAVSO. That being the case, we need to establish some ground rules so that we can keep your contribution functioning well in the years to come. These rules are meant to be practical and not onerous. Roughly speaking, they cover Planning, Coding, Testing, and Documentation.

2. Planning

For your project, we will assign a software mentor who is familiar with our science needs and the larger AAVSO computing environment, to provide guidance as the work progresses. You and the mentor will first draw up a project proposal that outlines:

   A) What the finished program will do.
   B) The languages, support packages, and execution environments.
   C) Interfaces with existing computer resources.

(A) need not be a formal functional specification, and it is understood that projects will evolve over the course of implementation. Still, it is best to write down the details that can be surmised in advance. This helps us make sure that the finished product will best serve AAVSO community's needs, and also prevent "Feature Creep" from getting out of control.

(B) covers the programming language(s), libraries, and datasets to be used. We will have a set of languages we can support at AAVSO, with an eye toward long-term maintenance of your code. Care must be taken not to bring new libraries or data stores into our computing environment without due consideration for their sustainability.

Point (B) also covers where a new program will run. Will it execute on an AAVSO server as a native Linux or Windows application? As a Java application on the user's own computer? As JavaScript in a web browser? As an "App" on a mobile device? In the latter two cases, we must be careful about favoring or excluding specific run-time environments.

(C) covers access to databases and web service APIs within and without AAVSO that the new program will need.

User interfaces should be designed with existing AAVSO software in mind, so that there is consistency among programs.

[Note: the "program" may literally be a single executable piece of code, or it may be multi-component system including databases, etc.]

3. Coding Phase

Software will be written in the AAVSO development environment. You will be granted access to a Internet-accessible server system and code repository.

Most AAVSO apps are written in Django which is being deployed in a Drupal CMS environment on our website. We have some custom Drupal modules, but Django is preferred. Apps that do not need a web environment should be written in Python (or possibly JavaScript if that is more suitable for the app.) Note that we are currently a Python2 shop, but the change is coming: All Django code needs to be Python3 compatible.

The database used by the AAVSO is MariaDB (an offshoot of MySQL). Depending on the purpose of the app being developed, it is very likely that it will need to use one of the existing databases. Access to test databases will be provided as needed for development purposes.

Code style should follow industry standards. For example, Python code should follow the PEP 8 Style Guide (https://www.python.org/dev/peps/pep-0008/).

Your mentor will provide for more specific information on the AAVSO's computer infrastructure.

4. Testing

Alpha Testing: As early functionality solidifies, it will be helpful to have one or more computer-savvy people chosen by AAVSO HQ to experiment with the software to see if the design has proved generally suitable, or if significant changes should be considered.

Usability Testing: A usability test with 3 to 5 people chosen by AAVSO HQ will allow the developer to observe users (via Skype or similar tool if not in person) while they are interacting with the software for the first time. It gives the developer a chance to see how well the user can navigate the software and where stumbling blocks may exist. Improvements to the user interface and/or documentation can be made based on the results.

Beta Testing: Before software is released to the general community, a group of beta testers will be selected by the AAVSO to test the program's functionality and push it to its limits.

Regression/Unit Testing: Once the code becomes fairly mature, developer will work up an automated test harness that verifies, at some significant level, that the software runs properly, reads and writes to the database(s) appropriately, meets security standards and does not break any existing code. As the project approaches completion, the tests will become more thorough.

5. Documentation

Operating Instructions: Every new program will have a User's Guide. You will be expected to be heavily involved in the creation of this with the help of your mentor. For an externally-visible application, this covers what a user needs to know in order to run it. No application is so simple that it needs no introduction or directions for new users. For an internal program, the guide covers procedures for starting and stopping the program, fault isolation, and error recovery.

Maintenance Documents: Code should be self-documenting and there should be enough of it for a new programmer to take over maintenance of the program, including...

1. Simple notes within each module/function describing inputs, outputs and purpose.
2. A functional summary of all modules.
3. A list of all dependencies (both internal and external).
4. An overview of the source code tree.
5. Instructions for producing and installing the "executable" software (where applicable).
6. A change log.

6. Other Considerations

The AAVSO is a living, breathing entity. This implies that from time to time our infrastructure will change and evolve. For this reason, flexibility is important to us.

To stay in-the-loop on infrastructure changes that could affect your application, please create an AAVSO website account, go to "My Account" > "Email Settings" and sign up for "Developer Announcements".

It is also recommended that you subscribe to the AAVSO's "Software Development" forum (https://www.aavso.org/software-development-forum) which is often where you will see feedback from our community.

7. Thank you!

We understand that we have given you a lot of information and that you are undertaking a difficult and time-consuming project. For this reason, we would like to thank you in advance and let you know that appreciate your help and that we are here to support you.

8. Confidentiality Agreement

Please sign and return the attached "Volunteer Developer Confidentiality Agreement" form.

The American Association of Variable Star Observers

Volunteer Developer Confidentiality Agreement

This agreement dated_____, is made By and Between the American Association of Variable Star Observers and William Goltz**.**

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_____   _____
Stella Kafka   Volunteer's signature
AAVSO Director