GitUp: A Simple, Portable Backup Manager with Practical Version Control

Backing up a project is essential to its reliable completion. This process ranges anywhere from copying files to an external drive to using an automated service to store files online. Products such as Google Drive, Microsoft OneDrive, Adobe Creative Cloud and Dropbox offer automated backup services to protect projects from being lost. Some also offer version tracking that allows users to restore intermediary changes to files. Cloud-backup products are more reliable, secure, and easy to use than traditional external drive backups, but they have their fair share of disadvantages. Their backup speed and frequency is limited by internet speed because project data must be overwritten on the cloud server when files are changed. This, along with space constraints on cloud servers, can limit project size. Cloud backup products are also woefully inadequate at keeping track of and comparing previous versions of a project. Previous versions only exist for a given time frame and changes are not grouped meaningfully.

Distributed version control systems such as Git, Mercurial and Subversion solve some of the issues cloud backup systems face by tracking changes between multiple repositories. Version control systems provide a far more robust system for tracking changes in a project, but with that added functionality comes a whole host of new problems. Version control systems that allow multiple users to collaborate have added complexity that is unnecessary when used by a single user as a backup solution. Additionally, granular change tracking in version control systems is difficult to learn and not an automated process which costs users time and leads to potential vulnerabilities if used improperly. Like cloud-backup systems, version control systems require a software client to be installed in order to use.

Intermediary to cloud-backup and version control systems are version control wrappers such as GitKraken or IDE extensions. Wrappers provide a GUI but do little to simplify or automate interaction between users and project files for backup purposes. The portability and flexibility of a wrapper is also limited by the IDE or system it uses. For example, a user might write code in Eclipse and documentation in Word for a single project but these programs do not share version control wrapper extensions.

GitUp is a proposed project with the goal of building on reliable, automatic, and secure backup features of existing products by providing users with fast backup speed, granular version tracking, efficient use of storage space, and portability. GitUp will achieve this goal by extracting relevant features from the Git version control system and abstracting their usage for the purpose of backing up individual projects created by single users.

GitUp will be designed with all types of users in mind, from developers to graphic designers to authors. It simplicity ensures that it remains accessible to a wide range of users. To use GitUp, a user copies a self-contained GitUp file to the root directory of their project, where they specify project metadata (name, description etc.) and a backup location (local or online), which can be changed without affecting GitUp's services. GitUp automatically tracks project file versions and updates the backup whenever it detects a change. It maintains a compact backup repository

and provides simple version restoration with granularity ranging from the entire project to individual file changes.
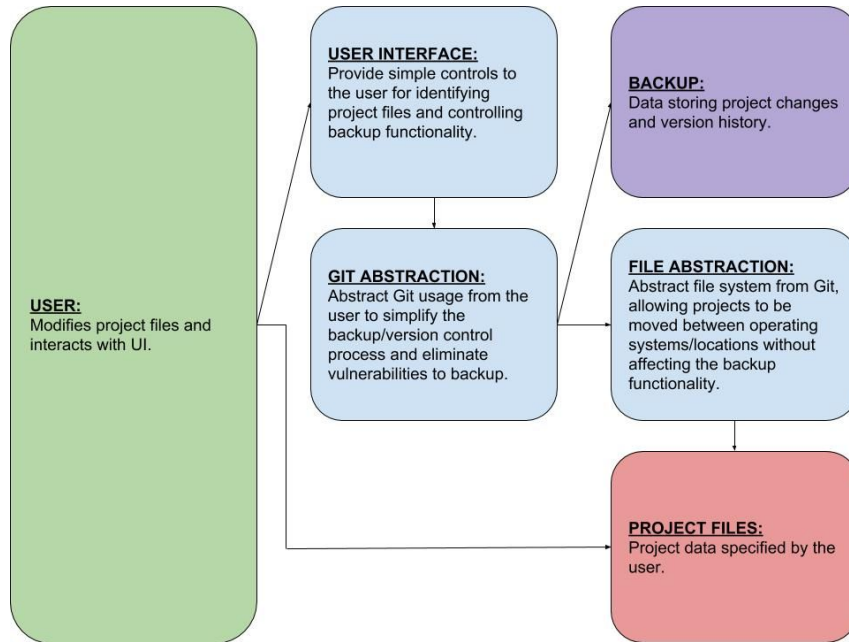
GitUp's architecture will include a text-based user interface, a Git abstraction layer, a file abstraction layer and a backup repository, as shown in the diagram above. Through its implementation, GitUp will differentiate itself from other backup systems by focusing on single-user projects and avoiding many of its alternatives' weaknesses. GitUp is faster than cloud-backup systems with more advanced version tracking. It is easier to use than version control systems and less vulnerable to user error, and is simpler and more automated/portable than version control wrappers.

No other system has been created with these differentiators in mind since existing products are sufficient, but not optimal, for the defined use case. GitUp will be created to be the optimal backup solution for single-user projects, all while being simple and intuitive to use. The risk that GitUp will not implement its differentiators in development will be mitigated through conducting comprehensive user research. When collecting information, we will focus on determining the most useful version control features needed in a backup system, user desires with respect to backup frequency, size and speed, and how we can ensure that user interaction with the system is simple and automated, all while maintaining portability.

To maintain simplicity and performance GitUp will be continuously evaluated on key metrics during development and after completion. These metrics include, but are not limited to: speed of backup vs. project size, size of backup vs. project size, and user satisfaction with interface usability, performance and portability, and version control and automation features.

Hours worked on proposal & presentation: 24 (team total)