Technical Writing Project Cover Sheet

Capstone Project Name: Character Generator for Tabletop RPGs on iOS

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Capstone Project Summary

Tabletop role-playing games (TRPGs) represent a small but significant market which supports a variety of publishers from large companies to individual creative and enterprising people. There are a variety game systems available, with varying levels of complexity and popularity, but very little, if any, standardization between them. Still, new systems, new versions of existing systems, and expansions of content based on these systems are almost continually emerging from this market and the community and culture surrounding it, bringing in new players with every generation.

A significant aspect of gaming, playing a TRPG, is creating the characters to be played. Often this is a time-consuming process, that can become very complex, and often delays the start of a new game. In many game systems, character generation is a research intensive and mathematical process, which makes it a prime candidate for automation. Unfortunately, and for a variety of reasons, this has notoriously been an underserved aspect of gaming by publishers who are primarily content producers, not software developers. The community has filled this gap to some degree, but most of these solutions are crude, inefficient, or quickly made obsolete. In addition to these problems, there is no official standardization between systems, software, or resources.

These problems can be resolved by combining applying the Agile Software Development methodology of Extreme Programming (XP) in order to enhance the character generation experience and improve the quality of character generation software. The processes and benefits of this method are well suited to serve this community and to meet this goal. In addition, XP will enable this proposed project to decouple character generation from desktop OS's, bring standardization and all the benefits thereof to TRPG software, and create a single character creation tool that can be used with any TRPG system.

These goals can be met in a variety of ways, most notably by leveraging the prevalence of mobile devices, by creating and publishing official standards, and by reaching a larger market to support ongoing development. The ultimate result of this project will be

a multi-platform, cloud-connected, mobile application for character development. This app will provide all of the most common features expected of a complete character generator as well as support for multiple game systems and community content. Also, importantly, this app will be fully supported by open standards and thus fully compatible with any software produced by other publishers or the TRPG community that also complies with these standards.

Review of Other Work

TRPGs as we know them today have been around since Dungeons & Dragons (D&D) was first published in 1974. It's hard to say how exactly how prevalent TRPGs are because "most role-playing game publishers are privately held companies and do not release sales figures" (Wikipedia, the free encyclopedia, 2015). Also, "role-playing game industry is absent of any market research — especially of any of notable value" (Trustrum, 2014), but there are some clues.

Wizards of the Coast (WotC), publisher of D&D and the largest publisher of role-playing games, conducted a market research survey in 1999, and while some market researchers "point out how unreliable this particular study [the Wizards of the Coast market research survey] is" (Trustrum, 2014) it still gives us an idea about the popularity of TRPGs. The study claimed that in 1999 in the United States an estimated 5.5 million people regularly played TRPGs with 2 million people playing monthly of whom 1.5 million played D&D.[1] With the success of WotC titles such as D&D, Magic: The Gathering, and Pokémon, WotC was purchased by Hasbro in 1999 for $350m (inflation adjusted $499,659,664). (Phillips, 2013) (Wikipedia, the free encyclopedia, 2015)

In 2013, ICv2, a market research company, estimated the hobby game market at $700 million with at least $5 million coming specifically from role-playing games. The actual TRPG market may be much bigger than this estimate because it was based on games sold in specialty stores and online hobby channels, and may not have accounted for sales from other venues. In August 2014, the D&D 5th edition Players Handbook, the main rulebook for D&D, hit #2 on Amazon's best sellers list and #1 on Amazon.de's (Amazon in Germany) new releases (Girdwood, 2014). It also "climbed to the top of Amazon sales

[1] I could not find the actual Wizards of the Coast market research study. Every link I followed to it's full text was broken.

charts and hit number one on both Publisher's Weekly and Wall Street Journal's hard-cover nonfiction lists" (Gilsdorf, 2014).

The prevalence of TRPG's also contributes to the popularity of Gen Con, a tabletop gaming convention. In 2015, Gen Con had 61,423 unique attendees, making it one of the largest conventions in North America (Wikipedia, the free encyclopedia, 2015).

TRPGs have embedded themselves in todays pop-culture both directly and indirectly. "An estimated 20 million people have played the game and spent at least $1 billion on its products since D&D's early days" and "a whole generation of screenwriters, novelists, directors, musicians, and actors who once played D&D — including Stephen Colbert, the late Robin Williams, Matt Groening, Vin Diesel, and George R. R. Martin — have proudly embraced their basement-dwelling days as a nerdy badge of honor" (Gilsdorf, 2014). The fact that the D&D Player's Handbook still ranks #26 in Amazon's best sellers list of books for teens shows that TRPGs can still bring in a whole new generation of gamers (Amazon.com, Inc, 2014).

TRPG publishers have produced dozens of games supported by hundreds of books, including core rule books, campaign settings, and supplemental materials, however there are very few official software tools to help out with more tedious game tasks, such as character creation or campaign management. These games are designed to be played with pencil, paper (such as pre-printed character sheets), and dice, but many players would prefer an automated system to assist with or simplify some areas of game preparation and management.

A TRPG gaming session consists of multiple "players" each with their own "character" (or role), and a "game master" (GM) or "dungeon master" (DM) who runs the campaign. A campaign may last one session or many years and consists of a continuous story, usually with the same party (group of players or characters), developed by the actions of the characters and the story telling of the GM.

Managing all but the shortest campaign can become very tedious. A GM has to choose or create a setting, backstory, and at least one plot line as the actions of the players may alter the story significantly. The GM is also responsible for creating and controlling non-player characters (NPCs), creating dungeons or other maps, and planning for multiple contingencies so that a gaming session doesn't have to stop while a GM creates a new plan due to unexpected player actions. Although this can be very tedious and time-consuming, most GMs are very creative people who enjoy creating entire worlds for their players and as such usually prefer to manage all of this by hand in notebooks full of drawings, maps, and notes.

While a good GM may spend hours, days, or even months designing and preparing a campaign, most players just want to dive right in to the action. Many TRPG publishers include pre-made or sample characters in their books to help newcomers get right into the game, but these cookie-cutter characters are generally not as fun to play as a character from a player's own imagination.

While various game systems differ, most use a process generally like the following for character creation. First, a character needs a race and sometimes a culture as well. Races usually include human, elf, dwarf, halfling (like a hobbit), gnome, half-breeds (like a half-elf), and hybrids, although many more may be available depending on the game. Some games use cultures do better define a character than by race alone. For example, a sylvan elf, raised amongst the trees, might be very different from an urban elf, raised in a city. Although it seems simple, a character's race and culture sets modifiers that may affect many other aspects of the character that must be tracked.

Second, a character needs a class or profession. This represents a character's general knowledge and/or training. Are they better at fighting or casting spells? Are they better at tracking and hunting or at performing arts and inspiring others? The most common classes or professions include cleric, fighter, bard, monk, ranger, rogue, and spell-casters such as mage, sorcerer, warlock, wizard, and druid. Like choosing a race, this

choice also comes with skills, traits, and modifiers that affect many other character details and must be tracked as well.

The third step involves generating a character's statistics or ability scores. These may include strength, dexterity (agility and/or quickness), constitution, self discipline, reasoning (intelligence), insight (wisdom), and presence (charisma). These statistics are usually generated randomly via dice rolls, but depending on the game system and GM may leave some level of control to the player. These scores and the modifiers from earlier choices combine to create most or all of a character's skills, abilities, etc.

At this point game systems begin to deviate in their individual character processes, but generally include choosing skills, feats, proficiencies, languages, traits, and talents, as well as buying starting equipment, writing descriptions, and even sketching a portrait. This whole process is consolidated onto a character sheet which is typically one to three pages. Even though the final product is only a few pages, a player may have to reference up to two hundred pages in a single book, or much more if they choose to use additional books for expanded spell lists, equipment, classes, etc. Sample character sheets from two prominent game systems – D&D and HARP – are included in Appendix 1 for reference.

Most publishers don't bother creating character generation software; they typically focus on publishing printed content, including character sheets for players to use with pencil and dice. In recent years, larger publishers, such as WotC and Iron Crown Enterprises (ICE) began publishing form-fillable PDF (PDF-F) versions of their character sheets.

To fill the need for character generators, tech-savvy fans have produced a number of solutions. The most common solution is to create a spreadsheet, often including macros, to semi-automate the character creation process. While this is a simple and effective solution, these spreadsheets can become very complicated, depending on how much

reference material is included. Also, macro-enabled spreadsheets can easily be used to spread computer viruses.

A few third-party character generators have been created, but all leave something to be desired. Most are game-system specific, meaning players of more than one TRPG must have a separate program for every game system they play. Also, many of these are limited to generating dice rolls for a character's statistics, leaving the player to manually type in other character attributes; that can actually be more tedious than simply writing directly on a character sheet.

The most successful third-party character generator was PCGen. For about a decade, this was the most complete character generation software available. The PCGen homepage describes the software as follows:

> PCGen is a **FREE** Open Source character generator and maintenance program for role-playing games. It currently supports the d20 RPG system and includes data sets based upon gaming material from Wizards of the Coast, Paizo Publishing and dozens of other publishers. The project's current focus is on gaming material released under Wizards of the Coast's **Open Gaming License** (OGL) but the PCGen team also works with publishers to get permission to include limited Closed Content as well. PCGen runs on Windows, Mac OS X and Unix/Linux using Java. (PCGen, 2012)

Unfortunately, the software hasn't been well maintained in recent years beyond mostly added source content. The program is still based on Java Runtime Environment 6 (JRE6), for which Oracle ended public support in February 2013 (Humble, 2013). JRE8 is current while JRE9 is available via early access for developers. PCGen does not run well on newer JREs and I could not get it to run at all on Java for Mac OS X without downgrading and breaking other Java-based applications.

Project Rationale

The prevalence of TRPGs, the ubiquity of mobile devices, and the current state of character generation software, provide an opportunity to enhance the TRPG experience. Character generators, such as PCGen, are not well maintained. Their updates are mostly limited to bug fixes, and added content. Due to their limited nature, many programs simply do not reach a large enough market to support on-going development, thus development progression is driven by the desires of hobbyist contributors rather than by the customers' wants and needs. This results in missed deadlines (if a project even develops or publishes them), a lack of responsiveness to changes in the TRPG environment, and abandonment of unreliable projects.

The best character generation software currently available, only runs on desktop operating systems. Much of the thrill of role-playing is the tangible aspect of using only pencil, paper, dice, and sometimes props or miniatures. All of these things are purpose specific and serve to enhance the gaming experience. Bringing a laptop or other computer to a gaming session is generally frowned upon because it diminishes the experience by cluttering the table, becoming a distraction, and degrading the social aspect of the game.

Many players who use programs or spreadsheets to generate characters, will often pre-print their character sheets to avoid becoming stigmatized as "that guy that always brings his computer". It makes much more sense to have a character generator on a mobile device because most players will already have one in their pocket, it won't clutter the table, and using a mobile device is less socially isolating that having a laptop open in front of you. There are a few character generators in the mobile market (Char Gen, Character Generator, Workonia, i-Summon, HeroMaker, RPG Scribe), but they are all very limited.

As mentioned before, there are a variety of game systems available, and many players play more than one. Many, such as D20 modern or True20, are derived from more

popular systems, such as D&D (d20). This allows programs such as PCGen to adapt relatively easily to handle many related games systems, however, because these programs embed game system logic directly into program, it is difficult to adapt them to handle significantly different game systems. Research for this proposal could not find a single application that could generate characters for two or more distinct game systems.

Character generation spreadsheets are even more limited in this aspect. They are usually designed for a specific game system, or sub-system. Spreadsheets that attempt to include more than core system logic, such as additional game content, quickly become cumbersome; difficult to both use and maintain.

Finally, there is no standardization between character generation applications. Without standards or adaptable software, new game systems must either build their own software or rely on the gaming community to develop new tools and/or spreadsheets. Many smaller developers lack the resources to develop their own software, availability of which could increase adoption rates of new game systems. The absence of standardization also make is difficult to reuse portable content – such as name lists, equipment or treasure lists, character concepts, etc. – across different systems.

The current state of character generation software, the desire to keep desktop and laptop computers out of gaming sessions, the tendency of gamers to play multiple game systems, and the lack of standardization among character generators, taken together present an opportunity. A new utility that addresses these problems and concerns would enhance the TRPG experience and be very well received in the TRPG community.

Systems Analysis and Methodology

In order to solve the problems above, this project will use a slightly modified Extreme Programming (XP) methodology of Agile Software Development. The deviations from this process will be limited to the adaptation of XP from a team of people working together to an individual fulfilling multiple roles. For example, instead of Pair Programming (code review taken to the extreme), a single developer will be sure to regularly break from coding, every 5 – 15 minutes, to review the code being written in context. XP will be used for the following reasons:

- XP focuses more on coding and avoids excessive paperwork and meetings. As this project will initially have only member, XP provides the benefits of planning and design meetings, even though there is no team with which to have such a meeting.
- XP produces working code faster, with fewer defects, and allows the development to adapt to new requirements that may be missed when planning as an individual rather than as a team.
- XP produces a better product, sooner, because features are developed into a fully functional product at the end of each iteration. This help to ensure that development will delayed by wasting time on unnecessary or low-priority features before they are needed.
- XP improves responsiveness to changing requirements. This project is being developed for the dynamic marketplace of mobile applications. As devices change, operating systems update, and users provide feedback, the requirements of this project will change. XP will enable this software to be better maintained and thus more sustainable than other character generators.
- By adhering as closely as possible to the XP values, rules, and process, the project will easily be able to scale up to a larger team in the future.

The XP process will begin with the following user stories and spike solutions:

- User Stories:
    - On an iPhone, the user should be able to click an app icon and open the app. There should be a home screen with options like create a character, open a saved character, and more.
    - The app should allow the user to select a game system. At a minimum, the first full release should include D&D 5e and HARP to prove it can adapt to significantly different systems.
    - An early version should allow the user to enter raw data for a character. This raw data can then be used to print a character sheet. This is the minimum functionality necessary to replicate pencil, paper, and dice.
    - A user should be able to save a character, even if it's not complete, and open it again later. Also, if the app closes or hides, such as a phone call or switching to another app, any data the user has entered should not be lost, or the character should be auto-saved.
    - Character sheets should print so that every entry is accompanied by a space to write any changes that occur during gameplay.
    - There should be a "dice bag". It should take input from experienced players such as "3d6+1d10" (three six-sided dice and one ten-sided die), as well as graphical selection for less experienced players. The dice results should be so random that no pattern will be detectible throughout a campaign.
    - There should be a "play this character now" mode so that temporary and permanent changes to a character can be entered quickly and efficiently during a game, with significantly distracting from the game. This way a

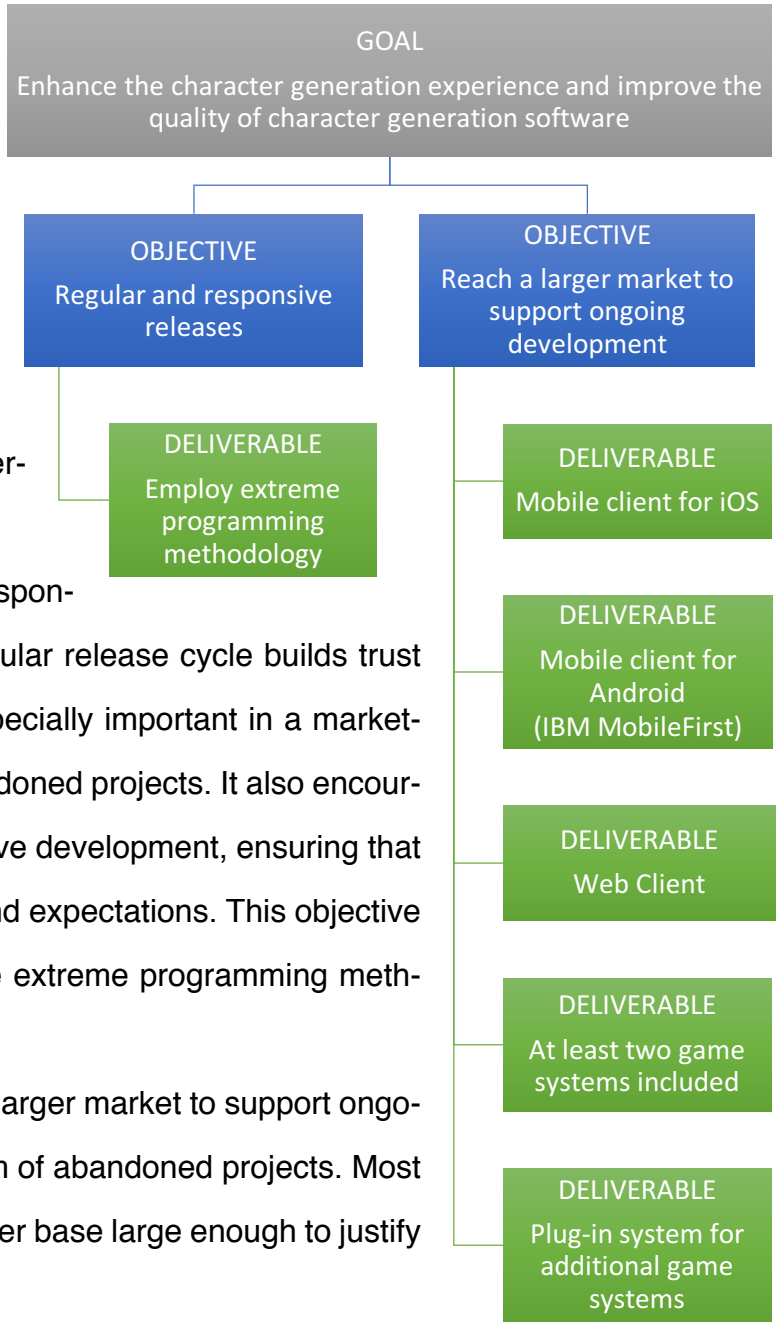
player won't have to transcribe in-game changes back to the app after a gaming session.

- Spike Solutions
    - Design and describe an XML formatted p-list specification for defining game-systems as serialized objects. This file will be called a "Game System Description" (GSD) file. The character generator will rely on a single "Game System Object" (GSO) for character creation in a given system. The GSD format must be able to define the simplest systems as well as every detail of more complicated systems to generate a functional GSO.
    - Design and describe an XML formatted p-list specification for defining a relationship between character data and a character sheet. The actual PDF-F character sheet should be bundled with or Base64 encoded directly into the "Character Sheet Description" (CSD) file to ensure error-free mapping of character data to the character sheet.
    - Design and describe an XML formatted p-list specification for storing character data. This "Character Data File" (CDF) should include a method of saving "snapshots" of a character, as it develops through a campaign. This provides a documented character history which can help a story or validate a character to a suspicious GM.

This list will grow, differentiate, and evolve as the projects develops through XP. All changes to user stories and spike solutions will be documented throughout the development process. Also, the items listed above are already listed in order of most valuable (within each grouping) to the customer based on preliminary iteration planning.

Goals and Objectives

This project will target four goals; one primary and three supporting. The primary goal is to “Enhance the TRPG character generation experience and improve the quality of character generation software.” This top-level goal sets the standard for the project and is supported by the rest of the goals which are, to “Decouple character generation from Desktop Operating systems”, to “Bring standardization to TRPG software,” and to “Provide a single character generation tool for multiple (any) TRPG game systems.”



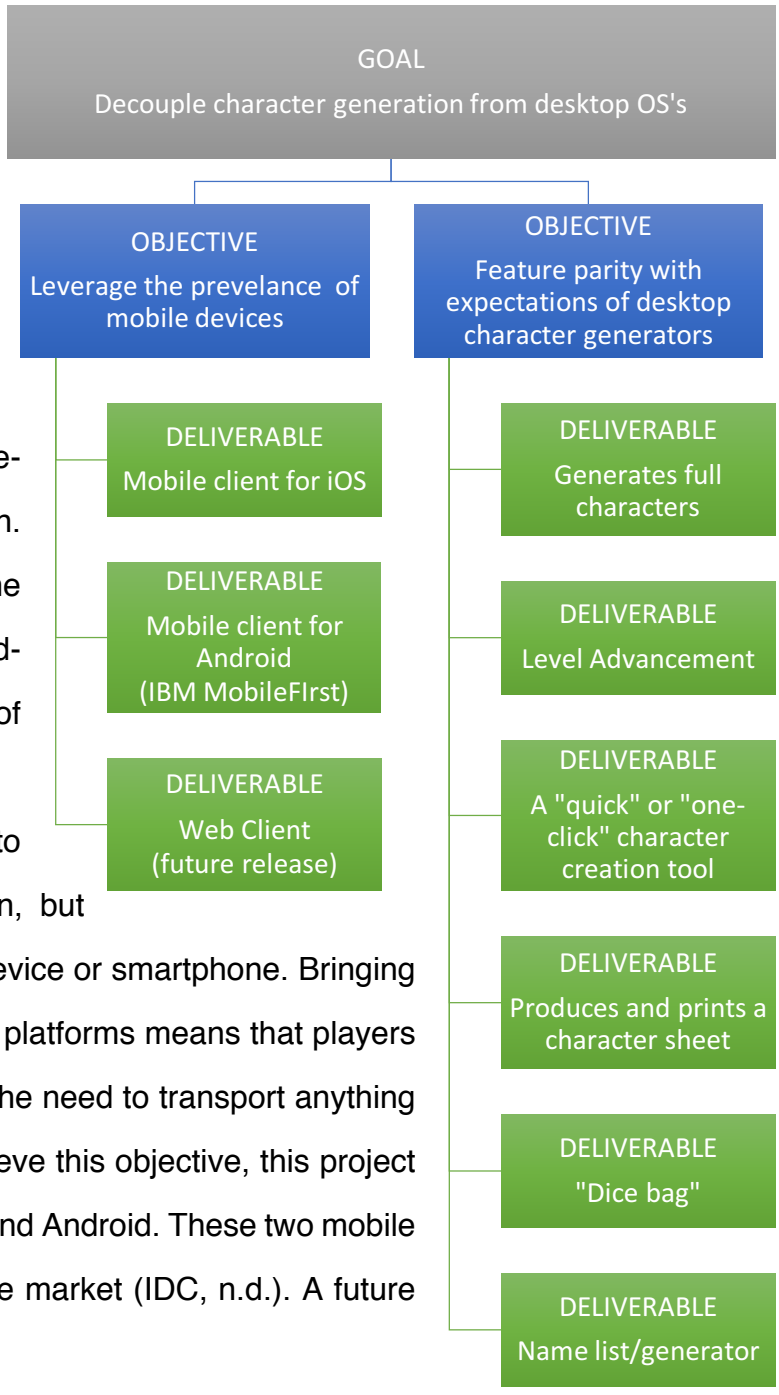
This primary goal is supported by the secondary goals, and will be achieved by meeting the following objectives: (1) implementing and sustaining a regular and responsive release cycle and (2) through building support for ongoing development by reaching a larger market than other character generation software.

The first objective, regular and responsive releases, is the most critical. A regular release cycle builds trust and confidence with users, which is especially important in a marketplace saturated by incomplete and abandoned projects. It also encourages the feedback required for responsive development, ensuring that the software meets the users’ desires and expectations. This objective will be accomplished by adhering to the extreme programming methodology, as discussed earlier.

The second objective, to reach a larger market to support ongoing development, addresses the problem of abandoned projects. Most character generators do not sustain a user base large enough to justify

the effort of development and maintenance. Reaching a larger market ensures that the project is supported and can be maintained. This directly supports the primary goal, and the following deliverables will meet this objective: (1) a mobile client for both iOS and Android, (2) at least two game systems included in the initial release, and (3) a “plug-in” system for additional game systems.

The second goal, to decouple character generation from desktop OS’s, will open character generation to many new opportunities. The social aspect of playing TRPGs is enhanced when players are free to use the most appropriate, available, or efficient means available for character creation and development. This means not being tied to a single device, especially a desktop or notebook computer, during a gaming session. This goal will depend on leveraging the prevalence of mobile devices and providing feature parity with the expectations of current desktop character generators.

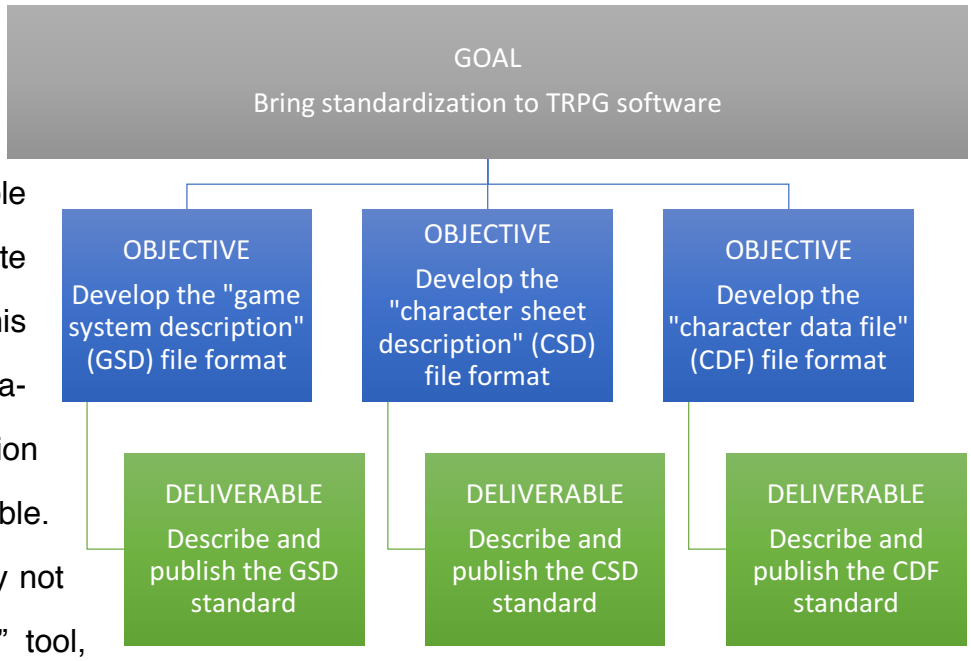


Most TRPG players don’t want to carry a computer to a gaming session, but nearly everyone now carries a mobile device or smartphone. Bringing character generation software to mobile platforms means that players gain the benefits of these tools without the need to transport anything beyond traditional TRPG items. To achieve this objective, this project will produce a native client for both iOS and Android. These two mobile OS’s comprise 96.7% of the smartphone market (IDC, n.d.). A future

release will also include a web client to serve any other mobile OS (Windows Phone, Blackberry OS, etc.) via it's web browser as well as people who prefer not to install to many apps on their phones.

The second objective for this goal will be to achieve feature parity with the expectations of desktop character generators. While features vary from publisher to publisher, some feature are generally expected of any good TRPG character generation software. Those features, which are the deliverables for this objective, are as follows: (1) generates full characters, not just core statistics; (2) level advancement – the ability to add levels to a character incrementally and automatically; (3) "One Click" character generator – useful for GM's to quickly create NPC's; (4) printable character sheets; (5) a virtual "dice bag" – allows simulated dice rolls; and (6) a random (list-based) name generator.

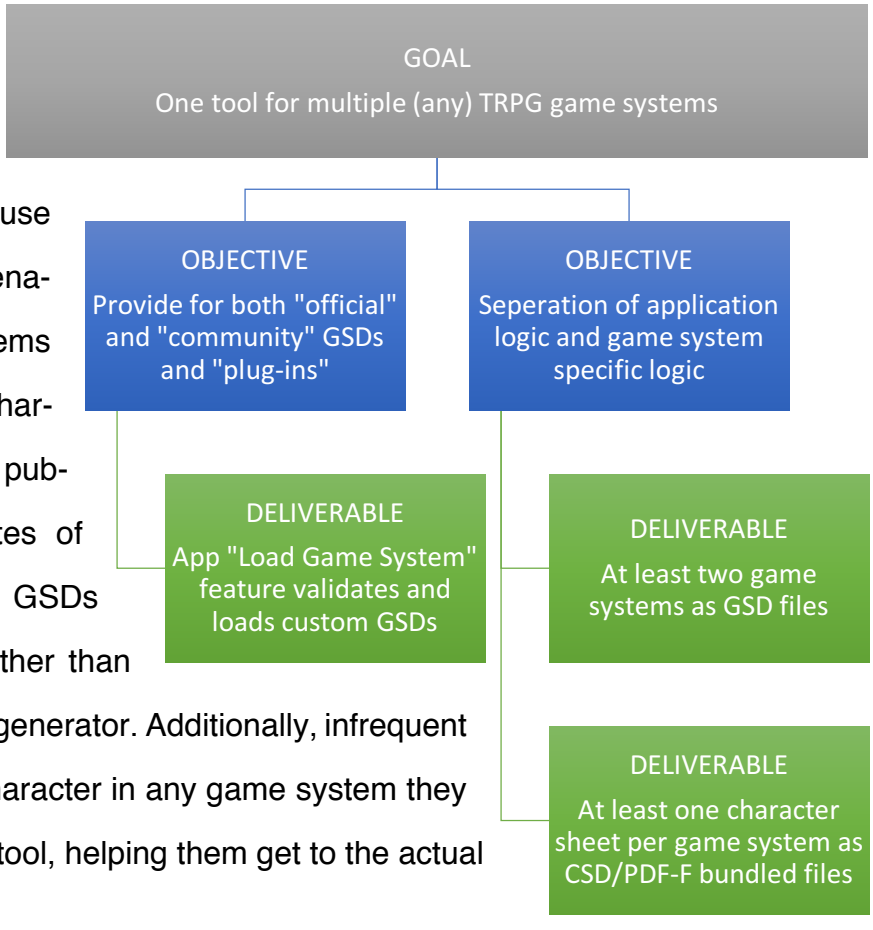
The third goal of this project is to standardize TRPG software. Many gamers are creative people who will still want to create and use their own tools. This can be seen in the prevalence of character generation spreadsheets available. These type of players may not accept a "one-size-fits-all" tool, unless that tool is something they can expand upon. Standardization will also allow software from various publishers and hobbyists to share and recycle content between various software and game systems.



This goal will be supported by the development of open standards for "Game System Description (GSD)", "Character Sheet Description (CSD)", and "Character Data File

(CDF)" file formats. These standards will be open-source, publicly available, and released under an (as yet undecided) Open Source Initiative (OSI) approved license (Open Source Initiative) and/or the Open Gaming License (OGL) (Wizards of the Coast, Inc., 2000). The GSD format should be structured defined such that any TRPG system, current or future, can be described. The CSD format should include both a printable character sheet and any instructions and logic needed to fully complete it. The CDF format should fully portable, i.e. able to store character data for a character in any game system and to be used to translate a character between systems. The published versions of these standards will be the deliverables for these objectives and this goal.

The fourth goal, already supported by and inter-related with the other goals, is to create a single character generator for use with any TRPG system. This will enable players of multiple game systems to use a single tool for all of their characters. This will also allow smaller publishers to increase adoption rates of their games by simply publishing GSDs and CSD files for their books rather than trying to build their own character generator. Additionally, infrequent players will be able to create a character in any game system they might want to play with a familiar tool, helping them get to the actual game much quicker.



In order to achieve this, the software should be able to load both "official" and "community" GSD's and plug-ins, and the application logic and the game systems' logic will be completely separate; the game systems' logic will be described in GSD files and

the application will interpret these files. Also, a future release will be able to load added-content plug-ins, such as additional equipment or name lists. The deliverables to meet these objectives will include at least two GSD files, each for a different game system, and a functioning feature within the app that allows custom GSD file to be loaded, validated, and used.

Project Deliverables

Although there appear, in the previous section, to be twenty-one deliverables, there are really sixteen. This is due to five of the deliverables supporting more than one objective. These include a “mobile client for iOS”, a “mobile client for Android”, a “web client”, a “plug-in system for additional GSDs that validates and loads additional GSDs”, and “at least two game systems (as GSDs) included with the app”. The other deliverables, in order of priority, are as follows: employ extreme programming methodology; a “dice bag”; describe and publish the GSD standard; describe and publish the CSD standard; describe and publish the CDF standard; at least one character sheet per game system as CSD/PDF-F bundle; app generates full characters; app produce and prints a character sheet; level advancement functionality; a “quick” or “one-click” character creation tool; and a name list/generator.

The first deliverable is to employ the extreme programming (XP) methodology. The following excerpt from Wikipedia summarily explains this process:

> **Extreme programming** (**XP**) is a software development methodology which is intended to improve software quality and responsiveness to changing customer requirements. As a type of agile software development, [1][2][3] it advocates frequent "releases" in short development cycles, which is intended to improve productivity and introduce checkpoints at which new customer requirements can be adopted.
>
> Other elements of extreme programming include: programming in pairs or doing extensive code review, unit testing of all code, avoiding programming of features until they are actually needed, a flat management structure, simplicity and clarity in code, expecting changes in the customer's

> requirements as time passes and the problem is better understood, and frequent communication with the customer and among programmers (Wikipedia, the free encyclopedia, 2016).

The key benefits from XP for this project come from frequent releases, unit testing, avoiding programming of features until they are actually needed, simplicity in code, and responsive to customer's requirements. This deliverable will be ongoing and met continuously by adhering to "The Rules of Extreme Programming" as detailed at http://www.extremeprogramming.org/rules.html.

The second deliverable is a mobile client for iOS. The app will be developed using the Swift programming language in Xcode, and utilize a Git repository for source code management. This deliverable is divided into two stages. Stage one will be met by loading and testing the app successfully on a development iPhone. Stage two will be met when the fully functional app is available from the iPhone App Store; this means an App with that includes all of the feature-related deliverables to follow.

The third deliverable is a "dice bag" feature. This is the highest priority feature because in addition to being an expected feature, it will provide the libraries and methods for "dice based" randomization for many of the other features. At a minimum, this feature must be able to receive and validate a "dice-roll string" and return a result with a satisfactorily high degree of randomness. A dice-roll string is a text string such as "2d4+3" or "1d20-5" which means "roll two four-sided dice and add three" or "roll one twenty-sided die and subtract five" respectively. A satisfactorily high degree of randomness means that there should be no human detectable pattern in dice roll results.

The fourth, fifth, and sixth deliverables are to describe and publish the GSD, CSD, and CDF standards. These proposed standards will be published together as Open Gaming Regulae Editicia[2] (OGREs). They will be published online as open-source documents, and shared with the TRPG community by posting to the Open Gaming Foundation and Wikipedia. All three will be Property List (p-list) compatible, Extensible Markup Language (XML)-based documents. As p-list files, they can be readily incorporated into iOS applications, and as valid XML, they will be easy to incorporate into any other project since every major programming language already has libraries to process XML.

The GSD standard should be able to describe any TRPG game system, that is based on dice, structured data (i.e. character sheets), and published reference material. It will do this by providing frameworks to describe a game system's data as an object and to describe the relationships between that data.

The CSD standard should be able to describe any TRPG character sheet. This will be accomplished by providing a framework to describe the data on the character sheet, that data's relationship to the specified GSD, and the sheet itself. The actual, printable character sheet will be included directly in the XML as a Base91 encoded, Portable Document Format Form (PDF-F). Base91 will be used instead of the more common Base64 or Base85 for its higher efficiency and better input compatibility (He, et al., 2010).

The CDF standard should be able to fully describe any TRPG character. There will be a single, extensible, open-gaming character model, that will store a character's data. Any game-system-specific extensions to this model must be specified in the relevant GSD. This single data model approach, will greatly facilitate the commuting of a consistent character between various game systems or OGRE-compatible software.

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[2] Regulae Editicia is a Latin phrase which translates to Proposed Rules/Standards.

The seventh deliverable is the ability for the mobile app to validate and load GSDs. Official GSDs will be available as “in-App purchases”, even though most will be free. This will enable users to “restore purchases” in the event that they have to reload the App for any reason (i.e. backup/restore, deleted and re-downloaded app, new phone, etc.). Community (or custom) GSDs will be able to be imported as well. Whenever a GSD, official or community, is loaded, the App should first validate the GSD to ensure both compatibility and security. This is necessary to prevent App crashes and to allow GSD developers to test their custom GSDs.

The eighth deliverable is the inclusion of two GSDs; one official GSD and one community GSD. This is to validate the full functionality of the GSD-loading feature, and to validate that the character generator actually functions with disparate game systems. Most likely these will be D&D 5e and HARP; two very different, very popular, and well documented systems.[3] These two GSD will each be accompanied by a CSD, which fulfills the ninth deliverable.

The tenth and eleventh deliverables are the ability to generate full characters and produce a printable character sheet. This first means all of the logic and functionality to use the loaded GSD to dynamically create a user interface, guide a user through the character generation process, and the produce and save a complete and valid CDF. The app should then be able to use the CDF to populate a CSD, display a complete character sheet, and allow the user to print or export it.

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[3] Also, I already own the core rulebooks for D&D and HARP, so they are already available for reference.

The next two deliverables, level advancement and “one-click” character creation, are essentially automated enhancements of the previous two. Level advancement means that a user can increase a character’s level, and based on the GSD, the App will guide the user through the level-up process and automatically calculate any changes or adjustments. “One-click” character creation is primarily for GMs to create NPC. It completely automates and randomizes the character creation process, within any limits that the user provides. For example, the GM might specify “3 level-4 gnomes”, click create, and immediately have the characters he needed.

The last deliverable to be included in the initial incarnation of this project will be a name generator. The app will include a preloaded and user-editable name list, from which names can randomly be chosen during the character creation process. A future release, based on feature priorities, will use a name database, with additional metadata, allowing the random generation of names based on character race, class, gender, etc., as well as the ability to purchase or download additional official or community name-lists.

The final two deliverables, a mobile App for Android and a web client, will not be in the initial release of this project, but their future release is critical to the ongoing success of this project. The web client will utilize cloud based storage, which will then become an option in both the iOS and Android versions. This will provide users with additional flexibility and help establish this project as a dependable and reputable platform.

Project Plan and Timelines

The following table details the project plan and timelines with deliverables listed in order of priority. Each deliverable includes an estimated duration in development hours for completion. The planned start and end dates are based on these estimates as well as sole developer's availability: 4 hours every weekday, and 8 hours on Saturday and Sunday. The final two deliverables are included only for reference, as they are not required in the initial release but will be part of the project's future plans.

Project Deliverable or Milestone	Duration	Planned Start Date	Planned End Date
Employ extreme programming methodology	Ongoing	n/a	n/a
Mobile client for iOS	7 days	1/25/2016	1/30/2016
"Dice Bag"	2 hours	1/25/2016	1/25/2016
Describe and publish the GSD standard	4 hours	1/25/2016	1/26/2016
Describe and publish the CSD standard	4 hours	1/26/2016	1/27/2016
Describe and publish the CDF standard	4 hours	1/27/2016	1/28/2016
Plug-in system for additional GSDs – Validates and loads custom GSDs	4 hours	1/28/2016	1/29/2016
At least two game systems (GSDs) included/available	2 x 2 hours	1/29/2016	1/30/2016
At least one character sheet per game system as CSD/PDF-F bundle	2 x 1 hours	1/30/2016	1/30/2016
Generates full characters	4 hours	1/30/2016	1/30/2016
Produces and prints a character sheet	1 hours	1/31/2016	1/31/2016
Level Advancement	2 hours	1/31/2016	1/31/2016
A "quick" or "one-click" character creation tool	2 hours	1/31/2016	1/31/2016
Name list/generator	1 hours	1/31/2016	1/31/2016
Mobile client for Android (IBM MobileFirst)	TBD	TBD	TBD
Web Client	TBD	TBD	TBD

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Appendix 1: Character Sheets

Name: **Race:** HARP Character Sheet

Profession (Lvl) _____

Ttl Lvl _____ XP _____

Culture _____

Ht _____ Wt _____ Age _____

Eyes _____ Hair _____ Sex _____

Initiative

Stat (Qu/In) + Race + Other Total

_____ _____ _____ _____

Fate Points _____

Stats

Stats	Bon	+ Race	+ Spec	= Total	DPs
St					
Co					
Ag					
Qu					
SD					
Re					
In					
Pr					

Total DPs _____

Resistance Rolls

Stamina _____ **Will** _____ **Magic** _____

Defensive Bonus

Armour	DB	Qu Bonus (x2-Armour Pen)	Magic	Chi Def.	Shield	Other	Total DB

Endurance Points _____ RUNNING TOTAL

Power Points _____ RUNNING TOTAL

Professional Abilities & Talents

Equipment

Item	Location	Weight

Max Pace

BMR Walk (x1)	
Run (x2)	
Fast Run (x3)	
Sprint (x4)	
Dash (x5)	

Total Weight _____

Encumbrance	Max Wt	Mod
Non (0-30lbs+St Bn)		-0
Light (31-60lbs+St Bn)		-10
Medium (61-90lbs+St Bn)		-20
Heavy (91+ lbs+St Bn)		-30

Treasure

PP _____ Gems & Jewelry

GP _____

SP _____

CP _____

Languages	W	S

Weapon _____ **OB** _____

Fumble Range _____ Damage Size _____ Damage Type _____

Special Notes _____

Weapon _____ **OB** _____

Fumble Range _____ Damage Size _____ Damage Type _____

Special Notes _____

Weapon _____ **OB** _____

Fumble Range _____ Damage Size _____ Damage Type _____

Special Notes _____

Weapon _____ **OB** _____

Fumble Range _____ Damage Size _____ Damage Type _____

Special Notes _____

Character Notes

Skill Name	Cost	Stats	# of Ranks	Bonus Mods Rank +	Stat +	Spec =	Total Bonus
Artistic							
Acting		Pr/In					
Dancing		Ag/Pr					
Mimicry		Pr/SD					
Play Instr:		Pr/Ag					
Play Instr:		Pr/Ag					
Singing		Pr/In					
Storytelling		Pr/In					
Athletic							
Acrobatics		Ag/SD					
Climbing		Ag/St					
Contortions		Ag/SD					
Combat							
Brawling		St/Ag					
Combat Styles:		/					
Combat Styles:		/					
Martial Arts: Strikes		St/Ag					
MA Styles:		SD/					
MA Styles:		SD/					
Martial Arts: Sweeps		St/Ag					
Weapon:		St/Ag					
Weapon:		St/Ag					
Weapon:		St/Ag					
Weapon:		St/Ag					
Concentration							
Chi Defense		SD/In					
Chi Focus		SD/St					
Chi Speed		SD/Qu					
Chi Strength		SD/St					
Mental Focus		SD/SD					
General							
Appraisal		Re/In					
Crafts:		Re/Ag					
Crafts:		Re/Ag					
Healing		Re/In					
Herbcraft		Re/In					
Mundane Lore:		Re/Re					
Mundane Lore:		Re/Re					
Perception		In/SD					
Resistance: Stamina		Co/Co					
Resistance: Will		SD/SD					
Resistance: Magic		In/In					
Rope Mastery		Re/Ag					
Signaling		Re/In					
Influence							
Duping		Pr/In					
Public Speaking		Pr/In					
Trading		Pr/In					

Skill Name	Cost	Stats	# of Ranks	Bonus Mods Rank +	Stat +	Spec =	Total Bonus
Mystical Arts							
Arcane Lore:		Re/Re					
Arcane Lore:		Re/Re					
Attunement		In/In					
Power Point Dev.		In/SD					
Runes		Re/In					
Outdoor							
Animal Handling		Pr/In					
Beastmastery		In/Pr					
Foraging/Survival		In/Re					
Horticulture		Re/In					
Navigation		Re/In					
Riding		Ag/SD					
Sailing		Ag/Re					
Tracking		SD/In					
Physical							
Armor		St/Ag					
Endurance		Co/SD					
Jumping		St/Ag					
Swimming		St/Ag					
Subterfuge							
Ambush		SD/Ag					
Disguise		Pr/SD					
Locks & Traps		In/Ag					
Pick Pockets		Ag/Qu					
Stalking & Hiding		SD/Ag					
Poisoning		In/SD					
Sniping		SD/Ag					
Streetwise		Pr/In					
Trickery		Pr/SD					
		/					
		/					
		/					
		/					
		/					
		/					

Spell Name	Cost	Stats	# of Ranks	Bonus Mods Rank +	Stat +	Spec =	Total Bonus
		/					
		/					
		/					
		/					
		/					
		/					
		/					
		/					
		/					
		/					

DUNGEONS & DRAGONS®

CHARACTER NAME

CLASS & LEVEL | BACKGROUND | PLAYER NAME

RACE | ALIGNMENT | EXPERIENCE POINTS

STRENGTH

DEXTERITY

CONSTITUTION

INTELLIGENCE

WISDOM

CHARISMA

INSPIRATION

PROFICIENCY BONUS

- ○ ____ Strength
- ○ ____ Dexterity
- ○ ____ Constitution
- ○ ____ Intelligence
- ○ ____ Wisdom
- ○ ____ Charisma

SAVING THROWS

- ○ ____ Acrobatics (Dex)
- ○ ____ Animal Handling (Wis)
- ○ ____ Arcana (Int)
- ○ ____ Athletics (Str)
- ○ ____ Deception (Cha)
- ○ ____ History (Int)
- ○ ____ Insight (Wis)
- ○ ____ Intimidation (Cha)
- ○ ____ Investigation (Int)
- ○ ____ Medicine (Wis)
- ○ ____ Nature (Int)
- ○ ____ Perception (Wis)
- ○ ____ Performance (Cha)
- ○ ____ Persuasion (Cha)
- ○ ____ Religion (Int)
- ○ ____ Sleight of Hand (Dex)
- ○ ____ Stealth (Dex)
- ○ ____ Survival (Wis)

SKILLS

ARMOR CLASS | INITIATIVE | SPEED

Hit Point Maximum ____

CURRENT HIT POINTS

TEMPORARY HIT POINTS

Total ____

HIT DICE

SUCCESSES ○○○

FAILURES ○○○

DEATH SAVES

PERSONALITY TRAITS

IDEALS

BONDS

FLAWS

NAME	ATK BONUS	DAMAGE/TYPE

ATTACKS & SPELLCASTING

PASSIVE WISDOM (PERCEPTION)

CP

SP

EP

GP

PP