

FALL 2022 – COS 397 COMPUTER SCIENCE CAPSTONE PROJECT PROPOSALS

Project Title: Front end development for Dungeons & Dragons creature database.

Submitted By: Edwin Nagy

Brief Description (approximately 500 words)

Frog God Games, a RPG-book publisher, has a database of creature stat blocks for use in our gaming publications. A simple stat block is presented below; they get longer and slightly more complicated. We currently have a front end that allows us to create and edit these creature data, but nothing that allows us or the public to access the information. An example of a front end that exists for this types of data can be seen at https://5e.tools/bestiary.html#aarakocra_mm. This provides a highly filterable, intuitive web-based portal to access a large amount of data. We would like to develop an App (web-based, self-contained, or both) that allows access to our existing data and allows public users to create new creatures to add to the data base. Users would have the option of making their new additions publicly available (likely after a review by a moderator) or keeping them for their own use. People who are creating new creatures should be provided with optional error checking related to the rules of creature creation (this is primarily math, but there are also some items that often go together that it would be nice to suggest or have available as packages). The application should allow users to access publicly available creatures (including those provided by Frog God) and have them printed to a custom PDF. We are considering the possibility that for a fee, this PDF could include our art pieces, currently stored separately but likely linkable to the database.

Simple stat block:

Ant Lion

Large beast, unaligned

Armor Class 15 (natural armor)

Hit Points 93 (11d10 + 33)

Saving Throws Con +5

Speed 30 ft., burrow 10 ft.

STR DEX CON INT WIS CHA

14 (+2) 11 (+0) 17 (+3) 2 (–4) 10 (+0) 4 (–3)

Skills Athletics +2, Stealth +2

Condition Immunities Charmed

Senses darkvision 60 ft., tremorsense 60 ft., passive Perception 10

Languages None

Challenge 4 (1,100 XP)

Actions

Bite. *Melee Weapon Attack:* +4 to hit, reach 5 ft., one creature. *Hit:* 18 (3d10 + 2) piercing damage and the target is grappled (escape DC 12).

Goals for the project (approximately 50 words)

Develop a two-way interface with our existing database that allows people to search in a highly customizable existing data and provides a flexible platform for people to add their own data. The interface could either be a stand-alone application or something that is hosted on our commercial website.

Total Duration / Elapsed Time [in weeks]:

I do not know, and would expect a student team to make an estimate.

External Schedules / Deadlines (conferences paper deadline? Meetings?) [if any]:

None

Learning Objectives for student teams:

Robust UI design—built for untrained users

Automated data checking

Development of granular filtering across multiple axes

Creation of formatted PDFs from textual data

Development or implementation of security tools that allow for public access but limit ease of data corruption.

Expected Project Experiences (select from the list):**Problem definition Project scope definition**

Design and implementation of research methodology Use of applied statistics

Data analysis

Workflow analysis**Development of functional specifications**

Identification of and negotiation for needed project resources Examination of an unfamiliar technical area (if students are unfamiliar with Dungeons and Dragons)

Identification of others' technical expertise

Identification and evaluation of alternatives**Development and presentation of recommendations****Responsibility and accountability for a discrete product****Role definition in a task group and participation in group dynamics**

Observation of supervisory activities (*e.g.*, personnel assignment, training, development of procedural guidelines)

Observation of management styles

Observation of organizational politics

Preparation of a manuscript for publication

Recommended experience (What operating system is required? What programming language? Other skills?):

The answers to these questions are solidly outside my knowledge area. The following is from the person who set up our database and the current internal-access front end:

It is an OPAL build on AWS—Oracle (database), PHP (front end), Apache (web server), and Linux (O/S). Amazon Web Services on the cloud allows small companies to avoid owning and maintaining all the hardware of a full stack build, and scales as needed. More specifically, the M3 front and back ends are hosted in two different data centers, I think Virginia and Ohio.

The Oracle database is a relational database management system (RDBMS), the most popular and trusted database in the industry. The software provides table structures to store relational data tied together with "keys", indexes for performance, and its own proprietary coding language called PL/SQL (programming language/structured query language) that is based in SQL but adds layers

of procedural and object-oriented methods to make it a complete language to extract, insert, update, and delete data in the tables. Others database objects exist to assist in full stack development: functions, sequences, etc. PL/SQL removes the need for a 3rd party middle tier language (such as C++ or C#) to connect the front and back ends. The natively compiled PL/SQL objects run in the database layer, thus improving performance and simplify data management. PHP is an open-source front end system preferred by many web developers for its simplicity and adaptability. Although Python and other FE platforms are trying to unseat the older PHP platform, it's doubtful they will any time soon—many FE platforms come and go while PHP has been around for decades, with endless community support.

AWS offers a \$0 solution for developers looking to learn how to create apps on cloud-based systems. DBaaS apps are becoming more prevalent, replaced static front end apps that rely on flat text files for "data storage".

The project sponsor can provide full information on the rules of monster creation. Existing knowledge would be a bonus but is not necessary.

Expected Outputs/Products and likely requirements (specific programming language, programming framework, operating system, integration with existing software, web-based requirements, etc.):

And from the person who maintains our web presence:

Our current website is hosted by GoDaddy and runs on the most recent version of Woocommerce using the Flatsome Theme. Our new website will be a shopify site connected to Amazon Seller Services.

Past experiences by the client (If software already exists, what is wrong? What has worked in previous versions, and what has not?):

We have an existing web-based creation tool with some automation. It works well for trained users. The public-facing tool needs robust searching and should provide optional automation support for those not trained in monster creation.

Proposed Testing Plan (How will the team test their product? Do you have recommended/required testing strategies? What resources are available (test platform, stand-alone network, etc.)? Is test data available?):

I would propose that the members of the Frog God staff first test the product, followed by an invitation only beta test to members of the public (possibly to UMaine's D&D club). We would provide a copy of our existing database to minimize risk of corrupting or losing existing data.

Benefits to U Maine:

Capstone benefits the students through real-world experience with real projects in ways I don't feel I need to enumerate here. A successful project would cite UMaine and the individuals responsible for its development. UMaine's Dungeons and Dragons club could use the software for their own gaming.

Project Sponsor(s):

Edwin Nagy, managing partner of Frog God Games and line editor for our Fifth Edition products.

Other Resource People:

Our database developer could likely answer questions specific to the database and its hosting.

Software/server access required:

We would provide to a copy of our database and could provide access as appropriate and necessary to our website.