





DUNGEONS & DRAGONS DRUPAL



DUNGEONS & DRAGONS

As a Drupal project

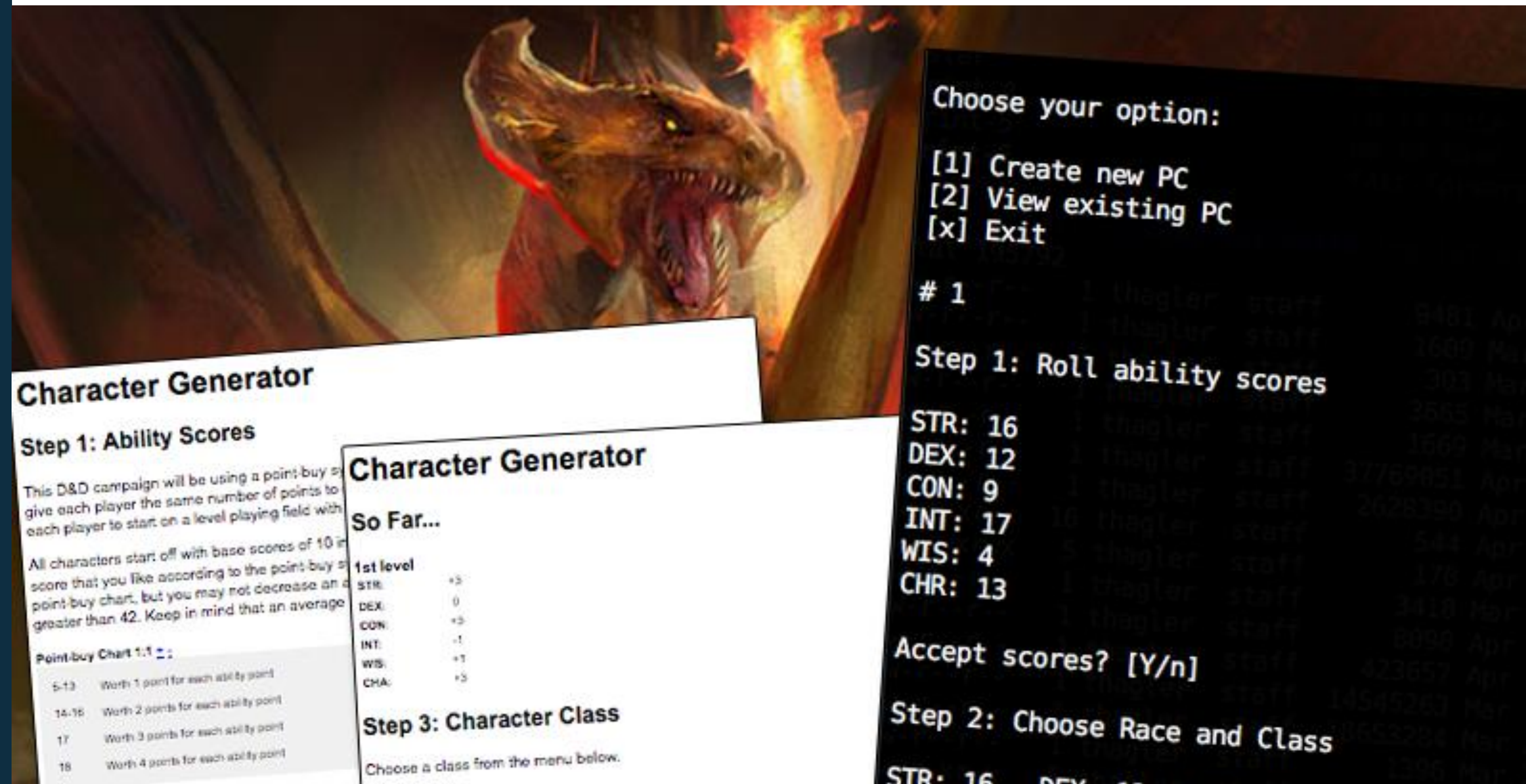
Hacking and slashing our way through
real-world content management
problems



LEARNING

Exploring New Technology With Familiar Problems

- C/C++
- Perl
- PHP
- JavaScript and jQuery
- Drupal 6, 7, 8, Field API, etc.





BEFORE WE BEGIN



Determine What To Build

- Determine the scope
- Character sheet as a wireframe
- Scores and Data Values
 - Content and computational models
 - Content entry
 - Access control for data modification
- Player Characters belong to players (users)
- Content entry order

DUNGEONS & DRAGONS®

CHARACTER NAME _____ LEVEL _____

RACE & CLASS _____ BACKGROUND _____ PLAYER NAME _____

EXPERIENCE POINTS _____ ALIGNMENT _____ ADVENTURING GROUP _____

ABILITY SCORES

STRENGTH: DEXTERITY:

CONSTITUTION: INTELLIGENCE:

WISDOM: CHARISMA:

SAVING THROWS

☐ Strength ☐ Dexterity ☐ Constitution ☐ Intelligence ☐ Wisdom ☐ Charisma

SKILLS

☐ 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)

ARMOR & HIT POINTS

ARMOR CLASS: MAX HP: TEMP HP:

CURRENT HIT POINTS:

INITIATIVE & SPEED

HIT DICE: INITIATIVE:

SPEED:

DEATH SAVED

SUCCESSSES: FAILURES:

ATTACKS & SPELLCASTING

NAME	ATTACK	DAMAGE	RANGE	AMMO	USED

FEATURES & TRAITS



D&D CHARACTER IN A NUTSHELL

Output

Character stats display - Pull up your character on desktop or tablet for quick reference

Character record sheet - Print out your character record sheet for use at the table (put the computers away!)



D&D CHARACTER IN A NUTSHELL

Input

Character sheet entry - Direct entering of fields

Character generator/wizard - Follow a series of conditional steps

Some data needs to be entered before other



ORDER OF DATA ENTRY

Option 1: Node Edit Form

1. Character background and motivation
2. Select race
3. Class and levels
4. Enter (roll or purchase) ability scores
5. Pick a background
6. Update racial characteristics
7. Update class details
8. Purchase equipment
9. Choose skills
10. Select alignment and finalize details



ORDER OF DATA ENTRY

Option 2: Webform

Step 1

- Roll the dice: Best 3 of 4d6 or point buy
- Assign rolls to abilities
- Choose a race
- Pick gender, background, and other role-playing traits that would influence who this character is
- What is the total level?
- Alignment, limited by class



ORDER OF DATA ENTRY

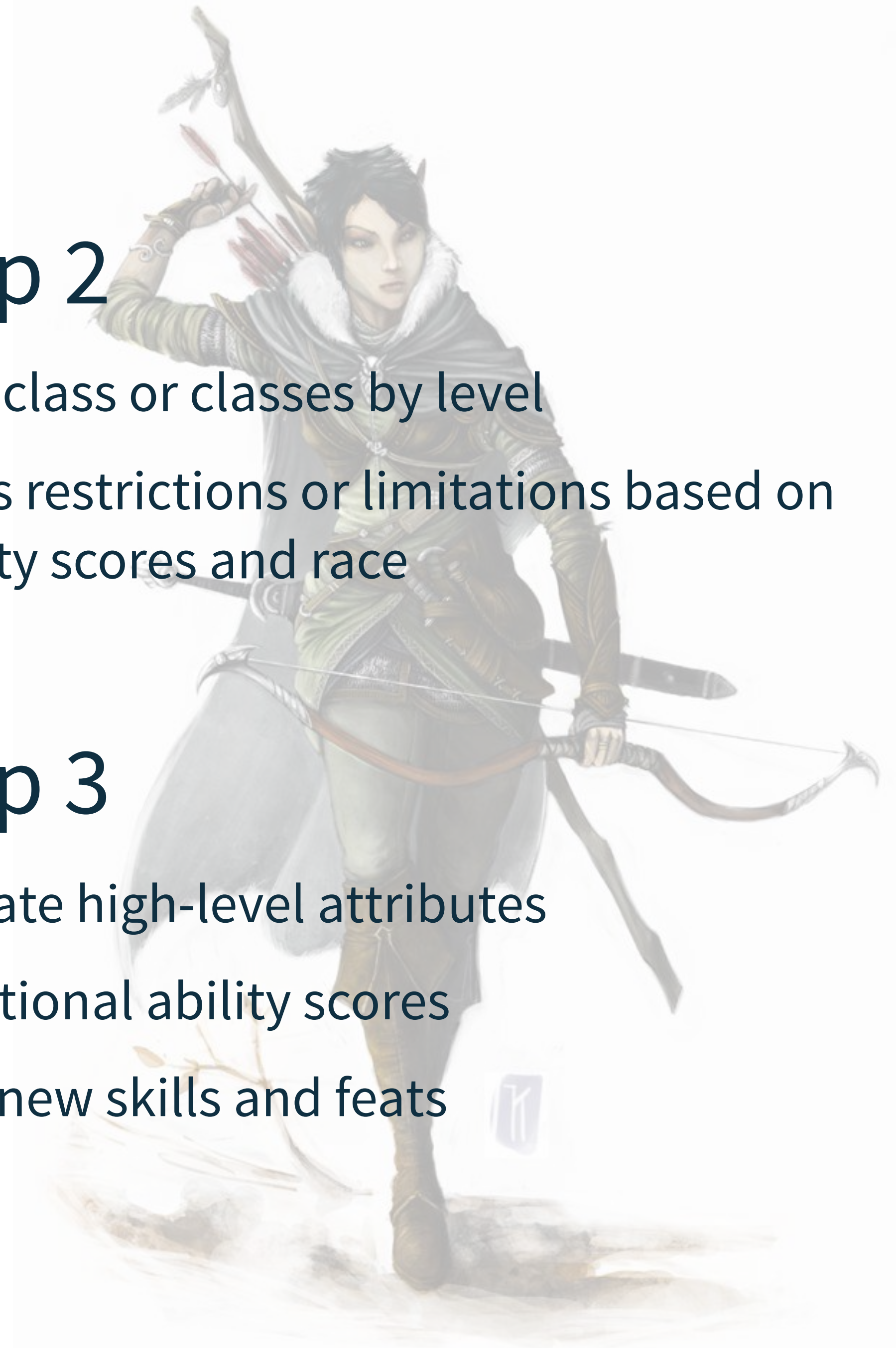
Option 2: Webform

Step 2

- Pick class or classes by level
- Class restrictions or limitations based on ability scores and race

Step 3

- Update high-level attributes
- Additional ability scores
- Add new skills and feats



ORDER OF DATA ENTRY

Option 2: Webform

Step 4

Add class-specific abilities

- Spells, familiars, meta-magic, and patrons
- Weapon proficiencies and fighting styles
- Turning undead and healing
- Wild shape, favored enemies, and animal companions

Step 5

Assign skills and knowledge areas

Languages



ORDER OF DATA ENTRY

Option 2: Webform

Step 6

Roll hit points based on hit die, Constitution bonus, and level(s)

Step 7

Determine money and purchase equipment

Some equipment will be unavailable

Appearance, description and all the other details

Name your new character!





CONTENT AND COMPUTATIONAL MODELS



Character Stats

- Race
- Class and Level
- Ability Scores
- Alignment
- Equipment, Weapons, and Armor
- Description and Backstory

The basics of a character's statistics are, at the heart, just a collection of raw data and field values.

Users select what they want from a finite list, but **the combination of these values** creates a fundamentally unique character that should be memorable and fun to play.



Character Stats

- Racial Modifiers and Traits
- Class Skills and Hit Die
- Ability Modifiers, Skills, and Saving Throws
- Limits Class
- AC, THAC0, Damage, and other effects
- Affects how the DM creates story hooks, adventure ideas, and how NPCs react to your character

Content is more than just fields, and a Character is more than just data points.

Determine your relational model and **you will see how values affect each other**. Race affects abilities. Class determines skills and other attributes.

Even background and character description ultimately affect choices surrounding equipment, which impacts AC, etc...



Analyzing The D&D Character Content Model

AT FIRST GLANCE

- A D&D Character is a standard node
 - A custom content type, “D&D Character”
- Ability Scores are an array of small integers
 - Range limited to 3-18
- Hit Points, Hit Die, and Armor Class are just integers
- Class, Race, and Alignment are text values from a select list



Analyzing The D&D Character Content Model

A DEEPER DIVE INTO THE UNDERDARK

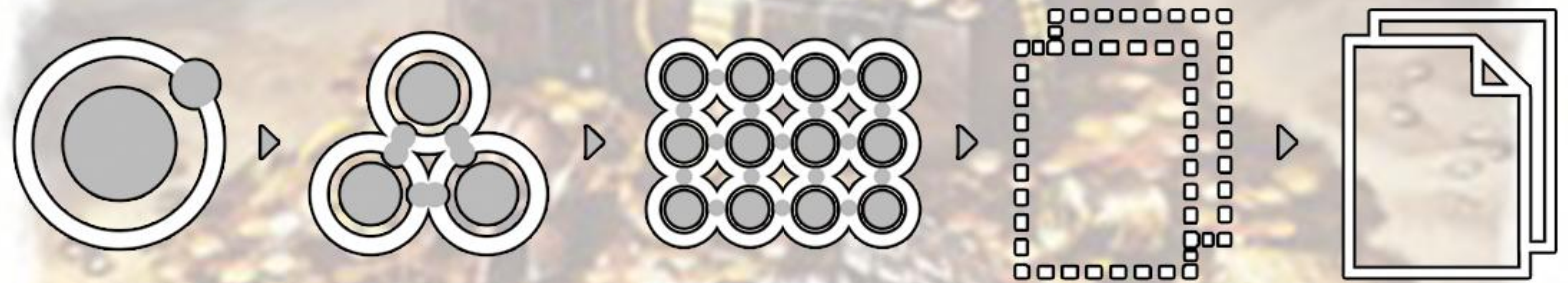
- Abilities provide bonuses and are computed.
- Class and Level changes Hit Die, Potions and curses alter Hit Points, and spells and armor enhance Armor Class.
- Each Race or Class can affect other PC attributes in a variety of ways, such as Ability score bonus/penalty and additional skills or spells.
- A node seems fine, but we need a way to handle overrides; Node plugin?



DATA DESIGN

Atomic Design and Data Models

1. Atoms
2. Molecules
3. Organism
4. Templates
5. Pages





FIELDS, ENTITIES, AND RELATIONSHIPS



Polymorphing Fields

- Many fields on a PC node would have compound values
- Race is a string from a list
- Ability is 6 values, each with modifiers and bonuses
- Feats and Skills have names, descriptions, game details...
- For your project, Drupal core fields won't cut it, and there's no contrib project...

Compound Fields

Like a recipe has ingredients, and each ingredient has sub-values: name, quantity, description, metric or imperial measurements.

Addresses have a number, street, secondary street, city, state or province, ZIP or postal code, and country; **which determines if other sub-values may be present or changed.**



Ability Scores

Ability Scores

- Strength
- Dexterity
- Constitution
- Intelligence
- Wisdom
- Charisma

Base score modified by race, higher level, and temporary effects.

Include an ability bonus for exceptionally high or low scores.

Ability bonuses are easy to calculate, no need to have a lookup table:

$$\text{Bonus} = \text{floor}(\text{BaseScore} / 2) - 5)$$

- 3 (-4)
- 4-5 (-3)
- 6-7 (-2)
- 8-9 (-1)
- 10-11 (no bonus)
- 12-13 (+1)
- 14-15 (+2)
- 16-17 (+3)
- 18 (+4)



More Compound Fields

Class

- Level (of each class)
- Leveling up is based on effective level

Skills

- Name
- Ranks
- Class skill
- Ability modifier
- Description



More Compound Fields

Feat

- Name
- Description
- Effects

Feat Effects include:

- Ability score bonus
- Initiative
- Advantages to a variety of rolls
- Proficiencies with equipment (think: permissions)
- Other in-game modifiers that don't affect the content here



Compound Fields

DIFFERENT SOLUTIONS TO THE SAME PROBLEM

Paragraphs

A contrib module that lets us combine mixed field types into a single field. We can place a paragraph as a single field on a content type.

Webform

Create a complex form in a UI. The form can be single-page or a multi-step form. We can create custom submit methods to handle the user form submission. Exports to YAML.

Field API

Create custom fields and field widgets.



INPUT OPTIONS



PARAGRAPHS

Compound Ability Scores

- Choose a race
- Base score
- Race bonus/penalty
- Feats and other skills
- Level bonus
- Total score and modifier



[Show row weights](#)

ABILITY SCORES *

+	Strength						Remove
	Base Score *	Race Bonus	Subrace Bonus	Feats	Level Bonus	Total Score	
	15				1	16	
+	Dexterity						Remove
	Base Score *	Race Bonus	Subrace Bonus	Feats	Level Bonus	Total Score	
	14	1		1		16	
+	Constitution						Remove
	Base Score *	Race Bonus	Subrace Bonus	Feats	Level Bonus	Total Score	
	12					12	
+	Intelligence						Remove
	Base Score *	Race Bonus	Subrace Bonus	Feats	Level Bonus	Total Score	
	12					12	
+	Wisdom						Remove
	Base Score *	Race Bonus	Subrace Bonus	Feats	Level Bonus	Total Score	
	12	1				13	
+	Charisma						Remove
	Base Score *	Race Bonus	Subrace Bonus	Feats	Level Bonus	Total Score	
	13	2				15	



WEBFORM

Conditional Multi-Step Forms

- Create a page for each step
- Nest elements within each page
- Conditionally show/hide fields based on previous selections

The main form shows a progress bar with 'Step 1', 'Step 2', and 'Complete'. Under 'Ability Scores', there are input fields for STR (16), DEX (14), CON (13), INT (9), WIS (8), and another STR (17). A 'Race' dropdown is set to 'Half-Elf'. A 'Next Page >' button is at the bottom.

The 'Class' modal shows a list with 'Fighter' and 'Sorcerer' selected. It has '< Previous Page' and 'Submit' buttons.

The 'CONDITIONAL LOGIC' window shows a table with the following configuration:

STATE	ELEMENT/SELECTOR	TRIGGER	VALUE
Visible	if All of the following is met:		
	Class [Select]	Value is	sorce

An 'Add another state' button is at the bottom of the logic window.



Creating Custom Field Types

- Create a field type
- Create a custom field widget
- Create a field formatter

FIELD API

Home » Administration » Structure » Content types » D&D Character

D&D Character

EDIT MANAGE FIELDS MANAGE DISPLAY COMMENT FIELDS COMMENT DISPLAY

LABEL	MACHINE NAME	FIELD TYPE	WIDGET	OPERATIONS
Character Name	title	Node module element		
Ability scores	field_dnd_character_abilities			edit delete
Gender	field_dnd_character_gender			edit delete
Age	field_dnd_character_age			edit delete
Size	field_dnd_character_size			edit delete
Height	field_dnd_character_height			
Initiative	field_dnd_character_init			
Weight	field_dnd_character_weight	Integer	Text field	
Initiative modifier	field_dnd_character_init_mod	Integer	Text field	
Initiative modifiers	field_dnd_character_init_mods	Text	Text field	
Saving throws	field_dnd_character_saves	D&D saving throw	D&D saving	
Skin Color	field_dnd_character_skin	Text	Text field	
Base attack	field_dnd_character_base_attack	Integer	Text field	
Saving Throw Modifiers	field_dnd_character_save_mods	Text		
Hair Color	field_dnd_character_hair	Text		
Feats	field_dnd_character_feats	List (text)		
Eye Color	field_dnd_character_eyes	Text		
Melee attack	field_dnd_character_melee	Integer		
Weapons	field_dnd_character_weapons	D&D weapon		
Laterality	field_dnd_character_laterality	Text	Text field	edit delete

CLASS AND LEVEL

Class name Class level

Sorcerer

Choose a character class. The levels for this class only.

Class name Class level

-Choose a class-

Choose a character class. The levels for this class only.

Add another item

ARMOR

Armor or protection Bonus Max dex bonus Check penalty Spell failure Speed Weight

Add another item

ARMOR CLASS MODIFIERS

A list of modifiers that affect the overall armor class.

SAVING THROWS

Saving Throw Fortitude	Total	Base save	Ability modifier	Magic modifier	Misc modifier	Temp score
Saving Throw Will	Total	Base save	Ability modifier	Magic modifier	Misc modifier	Temp score
Saving Throw Reflex	Total	Base save	Ability modifier	Magic modifier	Misc modifier	Temp score





EXAMPLES OF COMPUTATIONAL MODEL



Skills, Spells, And Equipment

Class features

- Different types of spells
- Skill ranks and class and cross-class skills

Racial bonuses

- Change ability scores
- Additional skills, language, or traits

Money and Background

- Roll wealth based on class
- Choosing backgrounds may change starting wealth and initial skills

Calculating Armor Class

- Armor and magic items
- Ability modifiers
- Spell effects



Conditions May Apply

How much to program, how much to rely on editorial input?

Required fields for some classes but not others

Conditional content entry for each class or race

- Node edit form validation/ submission tricks
- Webform wizards and Conditional Logic





**PULLING IT ALL
TOGETHER**



Node Output

VIEWING A NODE PAGE

Node template for Character

- node—dnd-character.html.twig

CSS added as a library

- D&D_character.dnd_character_fields
- dnd_character.dnd_character_node



Printable Character Sheets

PRINTING A D&D CHARACTER RECORD SHEET

Modules (many in early development)

- Entity Print
 - Uses WKHTMLtoPDF
- FillPDF
 - Can use an existing fillable PDF
- Printable and PDF generator API

Other options

- WK HTML to PDF library and custom code



FINAL PROJECT

D&D Character content type

Collection of Paragraph fields

Some custom UI work

Printable character sheets (PDF)





QUESTIONS? IDEAS?

