# Algorithm Plan

(as of Nov 22, 2016)

## Example Events

* OUAB Welcome Back Concert
  + Event for all students, faculty, and staff with valid BuckID
  + [Undergraduate Student] [Graduate Student] [Faculty/Staff] [Concert]
  + Score: 3/3
    - Score for guest: 3
* Dinner for 8 Buckeyes with Alumni
  + Event for Arts & Sciences Students
  + [Undergraduate Student] [Graduate Student]
  + Score: 2/3  
    [Everything under Arts & Sciences]
* Actuarial Science and Risk Management
  + Public event for the Actuarial Science field, particularly for undergrads
  + Score 1/3
  + [Undergraduate Student] [Graduate Student] [Actuarial Science]
    - Only show if Undergrad / Grad are selected and so is Actuarial Science
* HSPB Buckeyes and Batons
  + Event for Honors & Scholars students
  + 1
    - Only show if Honors & Scholars is selected

## Current Tags Tree

Type 1 = Share events with x-children if =3 stars, .50  
Type 2 = Share events with x-children if >2 stars, .75  
Type 3 = Do not share elements with ONLY this x-parent

* **Academic [0] Type 3**
  + **STEM [.50] Type 2**
    - **Engineering [.75] Type 1**
      * **Computer Science**
      * **Electrical**
      * **Mechanical**
    - **Math**
    - **Medical**
    - **Science [.75] Type 1**
      * Chemistry
      * Physics
      * Biology
      * Other
  + **Art [.50] Type 2**
    - Graphic Design
    - Fine Art
  + **Business [.75] Type 2**
    - **Entrepreneurship**
    - **Finance**
  + **Scholarships / Fellowships**
* **Athletics [0] Type 1**
  + **Sporting Events [.75] Type 2**
    - **Football**
    - Soccer
    - Volleyball
  + Intramural Type 2
  + Club Type 2
* **Social [0]**
  + **Greek Life**
  + **Philanthropy**
  + **Movies [.75]**
  + **Music [.75]**
    - Alternative Rock
    - Classical
    - Comedy
    - Country and Folk
    - Dance/Electronic
    - Festivals
    - Hard Rock/Metal
    - Jazz and Blues
    - Latin
    - New Age and Spiritual
    - R&B/Urban Soul
    - Rap and Hip-Hop
    - Rock and Pop
    - World Music
    - (From ticketmaster)
    - Other
  + **Other**
* User Type [0]
  + Undergraduate [0]
    - 1st year
    - 2nd year
    - 3rd year
    - 4th+ year
    - Honors [Default 0]
    - Scholars [Default 0]
  + Graduate [0]
    - Masters [Default 0]
    - PhD [Default 0]
  + Staff / Faculty [Default 0]
  + Alumni [Default 0]
  + Other

## Algorithm

* E := Set of tags held by the event [Default, all User Type tags]
  + By default, we want to show untagged events to the user for now, and for all user types.
  + We don’t want to narrow down the user tags initially, but we want to allow guests to pick that if they want.
* T := Map of tags preferenced by the user and their weight [0, 1, 2, default 1 for all unless specified] [Note: User types are only 1 or 0!]
  + User weighs every preference at 1 before they make an account, but guest filters allow them to choose user type and large categories (like STEM, Art, Business, Greek Life, etc.).
  + Once they make an account, have them pick their user type(s) immediately before registration, and then go to the preference panel. Set all other types to their defaults in column.
* R := Table of tag leafs and their relation to their parents [0:100, where 0 means do not show for any siblings and 100 means always show for 2-siblings]
* S := Stars / importance of event [0:3, default 2 for most events, default 1 for concerts that aren’t OUAB]
  + By default, we want to show all events with default settings to guests.
  + 1: Very specific, 5: Very general
    - 1: Very specific events for the exact major or genre or tag
      * Show only if specifically selected
      * Most concerts
      * Complex lectures
    - 2: Rather specific events but similar majors may enjoy
      * Show for some parents
    - 3: Very general event that most people will enjoy
      * Show for some grandparents
      * Free concerts like Spring Concert, Welcome Back
      * Events like football

If any element in E is a key in T assigned to 0,   
 Score = 0

Else if any element in E is a key in T assigned to 2 [EXCLUDING User Type tag, which can be only assigned to 1]  
 Score = 100

Else (if guest, nothing selected)

Score = S \* 25  
Else (if guest, larger categories selected)

Score = S \* 25 \* (2 if child of category selected, otherwise 1)  
Else (if user)

Calculate Z = (.25 \* (S+1))   
 (1 -> .50, 2 -> .75, 3-> 1.0)

For every tag i of E and T (where key = 2) exists in R, set r = that relationship  
 Score = MAX(ri \* Z) or STOP at >= 50

If Score >= 50, show event

Ultimately, we want to show the event if (T & E share tag of E.key = 2) or (T & E share tag with r = .50 and S = 3 => Score = .50) or (T & E share tag with r = .75 and 2 star => Score = .56) or (T & E share tag with r = .75 and 3 star => Score = .75)

Now, we can probably simplify this system but it should be okay for now. Basically for tags like music, we only want to share if 3 stars, but for tags like Engineering, we may share if 2 stars. Art & Math though, don’t mix so we don’t share at all.