Grade Calculator

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1 Item Definition

An item is a 2-tuple (n, g) where n is a string representing the name of the item and g is a non-negative real number representing the grade for the item.

2 Item Grade Formula

Let I be an arbitrary item. Let p_{earned} be a non-negative real number representing the amount of points earned on I. Let p_{total} be a positive real number representing the total points I is worth. Then g is the grade earned for I.

$$g = \frac{p_{earned}}{p_{total}}$$

3 Category Definition

A category is a 5-tuple (n, g, w, I, D) where n is a string representing the category name, g is a non-negative real number representing the category grade, w is a positive real number representing the category weight such that $0 \leq w \leq 1$, I is a set of items pertaining to the category, and D is a set of dropped items where $D \subset I$.

4 Category Grade Formula

Let G_I be the set of grades for all items in some category C such that $G_I \subset (\mathbb{R} - \mathbb{R}^-)$. Let G_D be the set of grades for all dropped items within C such that $G_D \subset G_I$ and let be i be some item in $(I - D)$. Then,

$$g = \frac{1}{\mid G_I - G_D \mid} \sum_{i=1}^{|G_I - G_D|} g_i$$

where $g_i \in (G_I - G_D)$.

5 Course Definition

A course is a 4-tuple (n, g, C, E) where n is a string representing the name of the category, g is a non-negative real number representing the grade for that course, C is the set of categories of the course, and E is the set of categories with no items within them such that $E \subset C$.

6 Course Grade Formula

Let $G_{(C-E)}$ be set of grades

$$g = \frac{\sum_{k=1}^{|C-E|} w_k g_k}{\sum_{k=1}^{|C-E|} w_k}$$

where $g_k \in G$ and $w_k \in W$.

7 Combined Formula

$$g = \frac{\sum_{k=1}^{|C-E|} (\frac{w_k}{|G_{I_k} - G_{D_k}|} \sum_{i=1}^{|G_{I_k} - G_{D_k}|} (\frac{p_{E_i}}{p_{T_i}}))}{\sum_{k=1}^{|C-E|}}$$