CoScore rule preparation specification

# 1 Basic form

A structured JSON language is used instead of the natural language describing the scoring rules,It consists of three parts: atoms, combos and comboMode, as shown in Example 1.

**Illustration of the basic form of Example 1**

{

"atoms":{...},

"combos":{...},

"comboMode": "ADD"

}

The atomic rule (atoms) is used to represent the scoring rule used, and is composed of a plurality of atomic units;The combination rule (combos) is used to represent the combination scoring method of the scoring rule, and is composed of several combination units.

# 2 Specific agreement

## 2.1 Atomic rules (atoms)

It is composed of several atomic units, as in Example 2. Each atomic unit holds a numeric ID as a key, and the corresponding value is a JSON unit.It consists of two parts: rule type and rule description.

An atomic rule, when invoked, returns two values.One is a logical value, indicating the hit condition of the rule, and the value range is [True, False];One is the solution value, which represents the value of the rule hit.

In general, when the logical value is True, the evaluation value is greater than 0; when the logical value is False, the evaluation value is 0.

**Example 2 Basic Form (atoms)**

{

"atoms":{

"0":{

"type": "EM",

"Desc": "Hello"

}

"1":{...}

},

"combos":{...}

}

Normative conventions for rule type (type) and rule description (desc) are given in 3.1.1-3.1.6.

### 2.1.1 Completely Exact Matching Rule EM

**2.1.1.1 When the rule type is set to EM, it means that the atomic unit is a completely exact matching rule unit.**

**2.1.1.2 In the case of the 2.1.1.1 convention, the rule description (desc) must be a string.The string can be a single answer string or multiple answer strings separated by half-width commas ",".**

**2.1.1.3 Subject to the provisions of 2.1.1.1,If and only if the student's answer is strictly equal to any one of the answer strings agreed in 2.1.1.2, the logical value True is returned, and the solution value is 1;Otherwise, the logical value False is returned, and the solution value is 0, as in Example 3.**

**Example 3 Completely Exact Matching Rule**

|  |  |  |
| --- | --- | --- |
| **Rule** | **The students answered** | **Return value** |
| {  "type": "EM",  "Desc": "greater than? >"  } | Bigger than | [True, 1] |
| > | [True, 1] |
| Greater than or equal to | [False, 0] |
| Not greater than | [False, 0] |

### 2.1.2 Substring exact matching rule SM

**2.1.2.1 When the rule type is set to SM, it means that the atomic unit is a string exact matching rule unit.**

**2.1.2.2 In the case of the 2.1.2.1 convention, the rule description (desc) must be a string.The string can be a single answer string or multiple answer strings separated by half-width commas ",".**

**2.1.2.3 In the case of the convention of 2.1.2.1, for each answer string, if and only if the student's answer contains its content,Record the hit rule once (the value increases by 1), as in Example 4.**

**2.1.2.4 If the answer string contains "|", then this means that there is more than one synonym option for this item.If the answer hits one or more of these items (the list of words in which the item is separated by a "|"),The hit rule is recorded only once (the value is recorded as 1). If the synonym option starts with "!"!", then once the word is hit, the answer string is skipped.". If the near synonym option begins with "~",It means that all the words in the answer string need to be removed before the remaining synonym options are matched.**

**2.1.2.5 If the final number of rule hits is 0, the logical value False is returned, and the solution value is 0;Otherwise, returns a logical value of True, which is the number of times the rule is hit.**

**Example 4 Substring Exact Matching Rule**

|  |  |  |
| --- | --- | --- |
| **Rule** | **The students answered** | **Return value** |
| {  "type": "SM",  "Desc": "Love, Motherland | Country",  "slot": 0  } | I love my country, I love my motherland. | [True, 2] |
| Our country | [False, 0] |
| My family | [False, 0] |
| Motherland Motherland State State | [True, 1] |

### 2.1.3 One-way closeness matching rule OP

**2.1.3.1 When the rule type is set to OP, it means that the atomic unit is a one-way close matching rule unit.**

**2.1.3.2 In the case of the 2.1.3.1 convention, the rule description (desc) must be a string.The string must start with a numeric value in the range (0, 1] (hereinafter referred to as N) and a colon ":".The part that follows can be a single answer string or multiple answer strings separated by a comma ",".**

**2.1.3.3 Under the convention of 2.1.3.1, if and only if the student's answer contains a content with a maximum one-way match degree n ≥ N with the answer string,Return the logical value True, and evaluate the value n; otherwise, return the logical value False, and evaluate the value 0, as in Example 5.**

**2.1.3.4One-way closeness calculation method: dynamic programming method is used to calculate the length of the largest common subsequence of the student's answer and the answer string.This length is then divided by the length of the answer string to get the one-way closeness.**

**Example 5 One-way closeness rule**

|  |  |  |
| --- | --- | --- |
| **Rule** | **The students answered** | **Return value** |
| {  "type": "OP",  "Desc": "0.4: fall around and fall back",  "slot": 0  } | One, two, three, four, five. | [True, 0.60] |
| One, two, go around, three, four, go down. | [True, 0.40] |
| Return first and then fall | [False, 0] |
| The order is: go around and fall back. | [True, 1.00] |

### 2.1.4 Similarity Rule CS

**2.1.4.1 When the rule type is set as CS, it means that the atomic unit is a similarity rule unit.**

**2.1.4.2 Rule description and return conditions are the same as those in 2.1.3.2 and 2.1.3.3.In contrast, the solution of "one-way matching degree" is changed to "Jaccard similarity".**

## 2.2 Combination rules (combos)

It is composed of several combined units, as shown in Example 6. Each combined unit holds a letter ID as a key, and the corresponding value is a JSON unit.Composed of a combination expression (combo), a benchmark score (score), and a scoring mode (mode).

**Example 6 Basic Form Schematic (combos)**

{

"rules":{...},

"combos":{

"A":{

"combo": "G(0,T(0)) and G(1,T(0))",

"score": 5,

"mode": "logic"

},

"B":{...}

}

}

See 3.2.1-3.2.2 for the normative conventions of the combination expression (combo), benchmark score (score) and scoring mode (mode).

### 2.2.1 Combination expression (combo)

**2.2.1.1 Quoting the student's answer For the nth blank of the student's answer (with 0 as the starting point of the serial number), four operators are specified:**

**The T operator T (n) represents the introduction of the nth empty original text (string) into the expression;**

**The L operator L (n) represents the introduction of the length (integer) of the nth null into the expression;**

**The Q operator Q (n) represents the introduction of the nth empty "empty or not" case (Boolean value) into the expression;**

**The F operator F (n) represents the introduction of an expression that converts the nth null into a numerical value (floating point number);**

In particular, when n is "\*", T ( '\*') indicates that all the empties are merged into a piece of text for processing, and L ( '\*') returns the sum of the lengths of all the texts.Q ( '\*') returns the sum of the numbers that are not empty. F ( '\*') returns the number converted after merging all the empty numbers into a piece of text.

**2.2.1.2 Call the atomic rule Use the student's answer to call the atomic rule and specify two operators:**

**The G operator G (K, s) indicates that the answer s is calculated by using the atomic rule with the ID of K, and the logical value is taken;**

**The M operator M (K, s) means that the answer s is calculated using the atomic rule with ID being K, and the solution value is taken;**

**2.2.1.3 Additional logic processing Additional logic processing is performed according to the expression f, specifying two operators:**

**The U operator U (f, C) represents the upper bound C on the value f and returns;**

**The operator A (a, B..) represents the number of variable inputs for which the return value is true.**

**The X operator X (a, B..) returns the maximum value for any number of variable inputs.**

**2.2.1.4 Legal symbols In addition to the above operators, legal symbols include if else and or not () = = > =!= < = < > True False +-\*/Number. Where the use of if else is limited to the single-line expression of A if B else C.**

**2.2.1.5 Solving the combined expression The combined expression constructed by 2.2.1.1-2.2.1.4 has a uniquely determined solution return value,It may be a Boolean type or a numeric type.**

### 2.2.2 Benchmark score and scoring mode

**2.2.2.1 The reference score (score) must be a numerical value. It represents the baseline score achieved when the combined scoring rule is in effect,The specific calculation method of this score needs to be coordinated with the scoring mode.**

**2.2.2.2 The scoring mode must be a string and must be logic or value.**

**2.2.2.3 When the scoring mode is logic, it indicates the logic scoring rule. At this time, the combination expression must return the Boolean type.If True is returned, the score corresponding to score will be counted. If False is returned, 0 will be counted.**

**2.2.2.4 When the scoring mode is value, it indicates the numerical scoring rule. In this case, the combination expression must return the numerical type.The score is [value \* score].**

## 2.3 Combination mode

**Combination mode must be'ADD 'or'MAX'.When the mode is "ADD", the final score of the question is the sum of the scoring results of each scoring rule unit in the combination rule;When the mode is "MAX", the final score of the question is the maximum value of the scoring results of each scoring rule unit in the combination rule.In particular, a total score of less than 0 will be set to 0, and a total score of more than 10 will be set to 10.**