**Test Reference:**

|  |  |
| --- | --- |
| **/\*\*** |  |
|  | **\* Add a new valid word to the database** |
|  | **\* @param word\_id word id as an integer** |
|  | **\* @param word the word itself as a String** |
|  | **\* @param value how much point the word worth in the game, as an integer** |
|  | **\* @param length length of the word, as an integer** |
|  | **\* @param is\_extension whether the word has been used as an extension, as a boolean** |
|  | **\* @param bonuses\_used how many times the word has been used as a bonus word, as an integer** |
|  | **\*/** |

**Equivalent Classes:**

|  |  |  |
| --- | --- | --- |
|  | **Valid** | **Invalid** |
| **word\_id** | * **1.1** - 1 * **1.2** - {x | x > 0 and x < 2147483647 } * **1.3** - 2147483647 | * **1.a -** null * **1.b -**  {x | x < 0 and x > -2147483648 } * **1.c -** 0 * **1.d -** -1 * **1.e -**  -2147483648 |
| **word** | * **2.1 -** string composed of permissible characters that abides by the length requirements * **2.2 -** uppercase word | * **2.a -** non-encoded characters * **2.b -** empty string * **2.c -** single char * **2.d -** integer type * **2.e -** >11 lettered word * **2.f -** null |
| **value** | * **3.1 -** {x | x ≥ 0 and x ≤ MAX\_POINTS\_PER\_WORD and x is an integer} * **3.2** - 0 * **3.3** - 1 * **3.4 -** MAX\_POINTS\_PER\_WORD | * **3.a -** {x | x < 0 } * **3.b -** float/double type * **3.c -** x > INT\_MAX * **3.d -** null |
| **length** | * **4.1 -** 1 * **4.2** - 11 * **4.3 -** {x | x > 1 and x < 11 and x is an integer} | **4.a -** 0  **4.b -** {x | x < 0 and x is an integer}  **4.c -** float/double type  **4.d -** {x | x > 11 and x is an integer}  **4.e -** null |
| **is\_extension** | * **5.1 -** true * **5.2 -** false | * **5.a -** null * **5.b -** 1 * **5.c -** 0 |
| **bonuses\_used** | * **6.1 -** 0 * **6.2** - 1 * **6.3 -** {x | x is an integer and x > 1 and x < INT\_MAX} | * **6.a -** null * **6.b -** {x | x is an integer and x < 0} * **6.c -** -1 * **6.d** - float/double type |

**Equivalence Classes:**

|  |  |
| --- | --- |
| Equivalence Class | Representative |
| 1.1 | 1 |
| 1.2 | 33 |
| 1.3 | 2147483647 |
| 1.a | null |
| 1.b | -33 |
| 1.c | 0 |
| 1.d | -1 |
| 1.e | -2147483648 |
| 2.1 | “cat” |
| 2.2 | “DOG” |
| 2.a | “典Josephus” |
| 2.b | “” |
| 2.c | “a” |
| 2.d | 78 |
| 2.e | “JosephusJosephus” |
| 2.f | null |
| 3.1 | 20 |
| 3.2 | 0 |
| 3.3 | 1 |
| 3.4 | 200 |
| 3.a | -5 |
| 3.b | 6.5 |
| 3.c | -1 |
| 3.d | null |
| 4.1 | 1 |
| 4.2 | 11 |
| 4.3 | 9 |
| 4.a | 0 |
| 4.b | -8 |
| 4.c | 6.74 |
| 4.d | 33 |
| 4.e | null |
| 5.1 | true |
| 5.2 | false |
| 5.a | null |
| 5.b | 1 |
| 5.c | 0 |
| 6.1 | 0 |
| 6.2 | 1 |
| 6.3 | 5 |
| 6.a | null |
| 6.b | -7 |
| 6.c | -1 |
| 6.d | 6.6 |

**Representative Boundaries:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Equiv. Class** | **Representative** | **Lower Boundary** | **Upper Boundary** |
| 1.1 | 1 | 0 | 2 |
| 1.2 | 33 | 32 | 34 |
| 1.3 | 2147483647 | 2147483646 | 2147483648 |
| 1.a | null | - | - |
| 1.b | -33 | -34 | -32 |
| 1.c | 0 | -1 | 1 |
| 1.d | -1 | -2 | 0 |
| 1.e | -2147483648 | -2147483649 | -2147483647 |
| 2.1 | “cat” | “ca” | “catt” |
| 2.2 | “DOG” | “DO” | “DOGG” |
| 2.a | “典Josephus” | “典Josephu” | “典Josephuss” |
| 2.b | “” | - | “a” |
| 2.c | “a” | “” | “aa” |
| 2.d | 78 | 77 | 79 |
| 2.e | “JosephusJosephus” | “JosephusJosephu” | “JosephusJosephuss” |
| 2.f | null | - | - |
| 3.1 | 20 | 19 | 21 |
| 3.2 | 0 | -1 | 1 |
| 3.3 | 1 | 0 | 2 |
| 3.4 | 200 | 199 | 201 |
| 3.a | -5 | -6 | -4 |
| 3.b | 6.5 | 6.4 | 6.6 |
| 3.c | -1 | -2 | 0 |
| 3.d | null | - | - |
| 4.1 | 1 | 0 | 2 |
| 4.2 | 11 | 10 | 12 |
| 4.3 | 9 | 8 | 10 |
| 4.a | 0 | -1 | 1 |
| 4.b | -8 | -9 | -7 |
| 4.c | 6.74 | 6.73 | 6.75 |
| 4.d | 33 | 32 | 34 |
| 4.e | null | - | - |
| 5.1 | true | - | - |
| 5.2 | false | - | - |
| 5.a | null | - | - |
| 5.b | 1 | 0 | 2 |
| 5.c | 0 | -1 | 1 |
| 6.1 | 0 | -1 | 1 |
| 6.2 | 1 | 0 | 2 |
| 6.3 | 5 | 4 | 6 |
| 6.a | null | - | - |
| 6.b | -7 | -8 | -6 |
| 6.c | -1 | -2 | 0 |
| 6.d | 6.6 | 6.5 | 6.7 |

**Test Cases:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test ID** | **word\_id** | **word** | **value** | **length** | **is\_extenstion** | **bonuses\_used** | **Eq. Class** | **Expected Output** |
| t\_0 | 1 | “cat” | 20 | 1 | true | 0 | 1.1, 2.1, 3.1, 4.1,5.1,6.1 |  |
| t\_1 | 33 | “DOG” | 0 | 11 | false | 1 | 1.2, 2.2, 3.2, 4.2, 5.2, 6.2 |  |
| t\_2 | 2147483647 | “cat” | 1 | 9 | true | 5 | 1.3, 2.1, 3.3, 4.3, 5.1, 6.3 |  |
| t\_3 | 33 | “DOG” | 200 | 11 | false | 1 | 1.2, 2.2, 3.4, 4.2, 5.2, 6.2 |  |
| t\_4 | null | “cat” | 20 | 1 | true | 0 | 1.a | ERROR |
| t\_5 | -33 | “DOG” | 0 | 11 | false | 1 | 1.b | ERROR |
| t\_6 | 0 | “DOG” | 200 | 11 | false | 1 | 1.c | ERROR |
| t\_7 | -1 | “cat” | 20 | 1 | true | 0 | 1.d | ERROR |
| t\_8 | -2147483648 | “DOG” | 0 | 11 | false | 1 | 1.e | ERROR |
| t\_9 | 1 | “典Josephus” | 20 | 1 | true | 0 | 2.a | ERROR |
| t\_10 | 33 | “” | 0 | 11 | false | 1 | 2.b | ERROR |
| t\_11 | 2147483647 | “a” | 1 | 9 | true | 5 | 2.c | ERROR |
| t\_12 | 33 | 78 | 200 | 11 | false | 1 | 2.d | ERROR |
| t\_13 | 1 | “JosephusJosephus” | 20 | 1 | true | 0 | 2.e | ERROR |
| t\_14 | 33 | null | 0 | 11 | false | 1 | 2.f | ERROR |
| t\_15 | 2147483647 | “cat” | -5 | 9 | true | 5 | 3.a | ERROR |
| t\_16 | 33 | “DOG” | 6.5 | 11 | false | 1 | 3.b | ERROR |
| t\_17 | 1 | “cat” | -1 | 1 | true | 0 | 3.c | ERROR |
| t\_18 | 33 | “DOG” | null | 11 | false | 1 | 3.d | ERROR |
| t\_19 | 2147483647 | “cat” | 1 | 0 | true | 5 | 4.a | ERROR |
| t\_20 | 33 | “DOG” | 200 | -8 | false | 1 | 4.b | ERROR |
| t\_21 | 1 | “cat” | 20 | 6.74 | true | 0 | 4.c | ERROR |
| t\_22 | 33 | “DOG” | 0 | 33 | false | 1 | 4.d | ERROR |
| t\_23 | 2147483647 | “cat” | 1 | null | true | 5 | 4.e | ERROR |
| t\_24 | 33 | “DOG” | 200 | 11 | null | 1 | 5.a | ERROR |
| t\_25 | 1 | “cat” | 20 | 1 | 1 | 0 | 5.b | ERROR |
| t\_26 | 33 | “DOG” | 0 | 11 | 0 | 1 | 5.c | ERROR |
| t\_27 | 2147483647 | “cat” | 1 | 9 | true | null | 6.a | ERROR |
| t\_28 | 33 | “DOG” | 200 | 11 | false | -7 | 6.b | ERROR |
| t\_29 | 1 | “cat” | 20 | 1 | true | -1 | 6.c | ERROR |
| t\_30 | 33 | “DOG” | 0 | 11 | false | 6.6 | 6.d | ERROR |
| t\_31 | 0 | “cat” | 1 | 9 | true | 5 | 1.1 |  |
| t\_32 | 2 | “DOG” | 200 | 11 | false | 1 | 1.1 |  |
| t\_33 | 32 | “cat” | 20 | 1 | true | 0 | 1.2 |  |
| t\_34 | 34 | “DOG” | 0 | 11 | false | 1 | 1.2 |  |
| t\_35 | 2147483646 | “cat” | 1 | 9 | true | 5 | 1.3 |  |
| t\_36 | 2147483648 | “DOG” | 200 | 11 | false | 1 | 1.3 |  |
| t\_37 | -34 | “cat” | 20 | 1 | true | 0 | 1.b | ERROR |
| t\_38 | -32 | “DOG” | 0 | 11 | false | 1 | 1.b | ERROR |
| t\_39 | -1 | “cat” | 1 | 9 | true | 5 | 1.c | ERROR |
| t\_40 | -2 | “DOG” | 200 | 11 | false | 1 | 1.d | ERROR |
| t\_41 | -2147483649 | “cat” | 20 | 1 | true | 0 | 1.e | ERROR |
| t\_42 | -2147483647 | “DOG” | 0 | 11 | false | 1 | 1.e | ERROR |
| t\_43 | 2147483647 | “ca” | 1 | 9 | true | 5 | 2.1 |  |
| t\_44 | 33 | “catt” | 200 | 11 | false | 1 | 2.1 |  |
| t\_45 | 1 | “DO” | 20 | 1 | true | 0 | 2.2 |  |
| t\_46 | 33 | “DOGG” | 0 | 11 | false | 1 | 2.2 |  |
| t\_47 | 2147483647 | “典Josephu” | 1 | 9 | true | 5 | 2.a | ERROR |
| t\_48 | 33 | “典Josephuss” | 200 | 11 | false | 1 | 2.a | ERROR |
| t\_49 | 1 | “a” | 20 | 1 | true | 0 | 2.b | ERROR |
| t\_50 | 33 | “aa” | 0 | 11 | false | 1 | 2.c | ERROR |
| t\_51 | 2147483647 | 77 | 1 | 9 | true | 5 | 2.d | ERROR |
| t\_52 | 33 | 79 | 200 | 11 | false | 1 | 2.d | ERROR |
| t\_53 | 1 | “JosephusJosephu” | 20 | 1 | true | 0 | 2.e | ERROR |
| t\_54 | 33 | “JosephusJosephuss” | 0 | 11 | false | 1 | 2.e | ERROR |
| t\_55 | 2147483647 | “cat” | 19 | 9 | true | 5 | 3.1 |  |
| t\_56 | 33 | “DOG” | 21 | 11 | false | 1 | 3.1 |  |
| t\_57 | 1 | “cat” | -1 | 1 | true | 0 | 3.2 |  |
| t\_58 | 33 | “DOG” | 2 | 11 | false | 1 | 3.3 |  |
| t\_59 | 2147483647 | “cat” | -6 | 9 | true | 5 | 3.a | ERROR |
| t\_60 | 33 | “DOG” | -4 | 11 | false | 1 | 3.a | ERROR |
| t\_61 | 1 | “cat” | 6.4 | 1 | true | 0 | 3.b | ERROR |
| t\_62 | 33 | “DOG” | 6.6 | 11 | false | 1 | 3.b | ERROR |
| t\_63 | 33 | “DOG” | -2 | 11 | false | 1 | 3.c | ERROR |
| t\_64 | 1 | “cat” | 20 | 0 | true | 0 | 4.1 |  |
| t\_65 | 33 | “DOG” | 0 | 2 | false | 1 | 4.1 |  |
| t\_66 | 2147483647 | “cat” | 1 | 10 | true | 5 | 4.2 |  |
| t\_67 | 33 | “DOG” | 200 | 12 | false | 1 | 4.2 |  |
| t\_68 | 1 | “cat” | 20 | 8 | true | 0 | 4.3 |  |
| t\_69 | 1 | “cat” | 6.4 | -1 | true | 0 | 4.a | ERROR |
| t\_70 | 33 | “DOG” | 6.6 | -9 | false | 1 | 4.b | ERROR |
| t\_71 | 33 | “DOG” | -2 | -7 | false | 1 | 4.b | ERROR |
| t\_72 | 1 | “cat” | 20 | 6.3 | true | 0 | 4.c | ERROR |
| t\_73 | 33 | “DOG” | 0 | 6.75 | false | 1 | 4.c | ERROR |
| t\_74 | 2147483647 | “cat” | 1 | 32 | true | 5 | 4.d | ERROR |
| t\_75 | 33 | “DOG” | 200 | 34 | false | 1 | 4.d | ERROR |
| t\_76 | 33 | “DOG” | 0 | 11 | 2 | 1 | 5.b | ERROR |
| t\_77 | 2147483647 | “cat” | 1 | 9 | -1 | 5 | 5.c | ERROR |
| t\_78 | 33 | “DOG” | 200 | 11 | false | -1 | 6.1 |  |
| t\_79 | 1 | “cat” | 20 | 1 | true | 2 | 6.2 |  |
| t\_80 | 33 | “DOG” | 0 | 11 | false | 4 | 6.3 |  |
| t\_81 | 2147483647 | “cat” | 1 | 9 | true | 5 | 6.3 |  |
| t\_82 | 33 | “DOG” | 200 | 11 | false | -8 | 6.b | ERROR |
| t\_83 | 1 | “cat” | 20 | 1 | true | -6 | 6.b | ERROR |
| t\_84 | 33 | “DOG” | 0 | 11 | false | -2 | 6.c | ERROR |
| t\_85 | 33 | “DOG” | 200 | 11 | false | 6.5 | 6.d | ERROR |
| t\_86 | 1 | “cat” | 20 | 1 | true | 6.7 | 6.d | ERROR |