**Notable Obstacles:**

1. While defining the function *isMotionMeaningful*, I first tried to find all meaningful motions. However, due to the uncertainty of the length of motion, it’s really hard to figure out all the situations. Then I tried to find all motions that violate the “meaningful rules”, a method pretty easier than the former one.
2. While defining the function *translateMotion*, I first ignored the fact that some situations like “3//” or “w/000/” was unnecessary to consider because they were already not meaningful. Therefore, it seems messy to come up with all situations in the function definition.
3. Some judgments within the if-else are quite long and the use of parentheses is troublesome. It is common that a misuse of a single parenthesis induces wrong results
4. To simplify that the number of beats in *motion* is the same as the number of slashes
5. While finding *motion* which is meaningful but intranslatable and setting the corresponding number to *badBeat*, I initially did not get the correct value of *badBeat* as I intended. However, after several analyses, I overcame that obstacle.

**Pseudocode:**

isMotionMeaningful:

…

If directions contain other letter, return false

for some special cases like zero beat or one beat or two beats, return true or false

for more than two beats, judge whether motions are meaningful by the formats and rules of meaningful motions, return true of false

…

numberOfBeats:

…

use a for-loop to count the number of slashes appeared in motion

…

convertToDecimal:

…

if both two characters of the string are digits, convert these digits to a decimal number

return the value

if only the last character is digit, convert it to a number

return the value

if neither is digit, return 1

…

translateMotion:

…

call isMotionMeaningful

if motion is not meaningful, return 1

if meaningful,

repeatedly:

find the last letter in the string

get the value of the decimal number before it

compare the value with the number of beats after the letter

if the number of beats is less, find corresponding value set to badBeat

return 3

repeatedly:

for each letter, find if the decimal number before it is 0 or 1

if so, set badBeat appropriately

return 4

repeatedly:

for each hold, find the decimal number representing the number of beats of that hold

extract a substring with length equals the decimal number, which starts from the character after that hold

if there exists one character in that string that not slash

set badBeat to the number of that beat

return 2

repeatedly:

while the index of motion is valid

if motion[i] is a digit, convert it into a decimal number

index increases by one

if motion[i] is a direction, check if the value of decimal number is zero

if so, append instructions with the lowercase of that direction

index increases by one

if not, append instructions with uppercases of that direction with

amount equals the value of the decimal number

store value of the number to another variable temp

reset number to zero

index increases by one

if motion[i] is a slash, check it the value of temp is zero

if not, increase the index by one

if so, and at the same time, if the character before that slash is a

direction

increases the index by one

if so and at the same time, if the character before that slash is also a

slash

append a dot to instructions

increases index by one

**Test Cases:**

1. //d/3// not meaningful because of a digit followed by a slash
2. /004d//// not meaningful because of three consecutive numbers
3. //3b/// not meaningful because of an inappropriate direction

4. the zero-beat condition

5. /// motion consists of only slashes

6. //W3/// not meaningful because a digit follows a direction

7. 3d///2w not meaningful because the string ends with a direction

8. //3d///2w/ ending prematurely, meaningful and return 3

9. //4W///d/ while a hold in effect, a beat consisting of a direction appears, meaningful and return 2

10. 01s// hold with length less than 2, meaningful and return 4

11. 3a///0s//2w/ hold with length less than 2/ ending prematurely, meaningful, return 4 or 3

12. w//s/3d///2w/// meaningful and translatable

13. 03W///10d////////// meaningful and translatable

14. 5w////0d//3w// while a hold in effect, a beat consisting of a direction appears/ hold with length less than 2/ ending prematurely, meaningful, return 4 or 2 or 3

15. 015 not meaningful because of three consecutive numbers