NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Graph Theory – 3 &
Generating Functions

Example 1 – Fun with words

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We don't like talking terminologies and definitions and abstraction in the beginning of the chapter, as in always let us start with a very motivating example rather a puzzle, look at this first line happens to be QUS and T,
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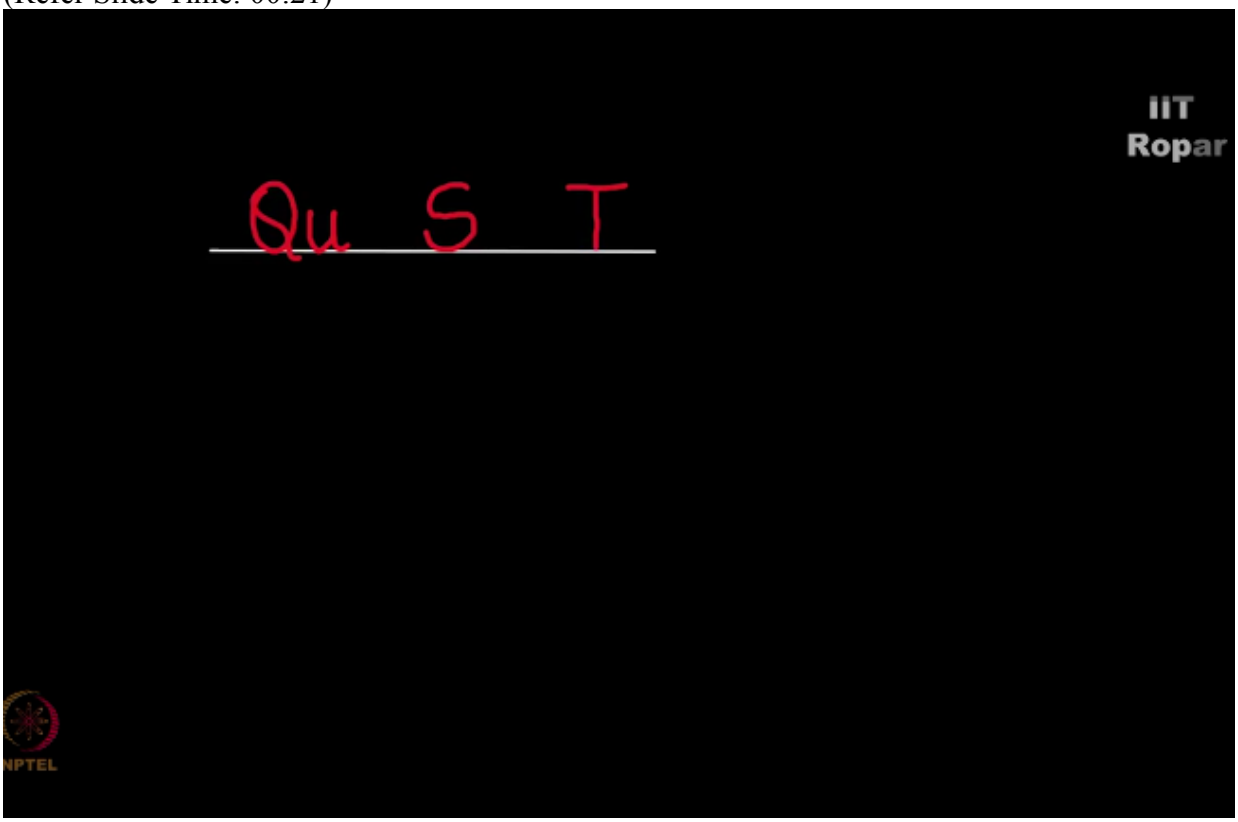

second line here is A and I,
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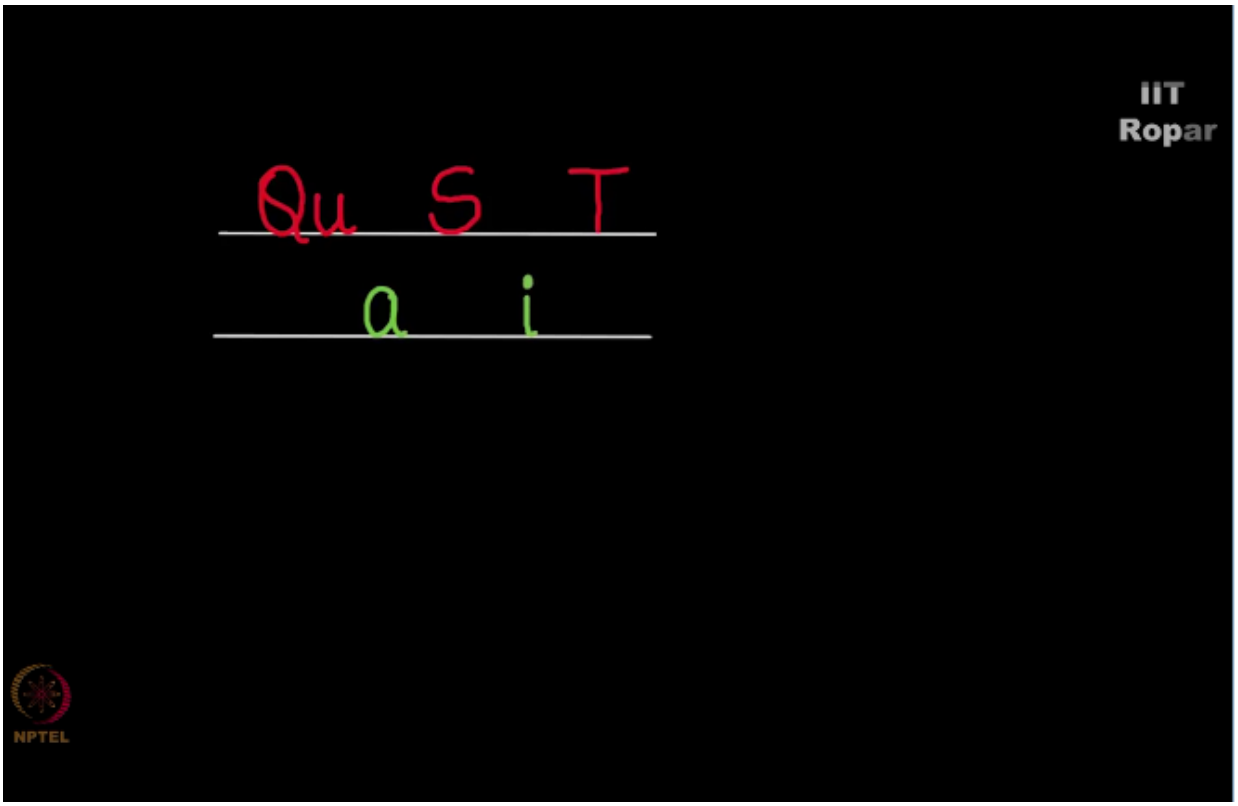

the third line is D, CK,

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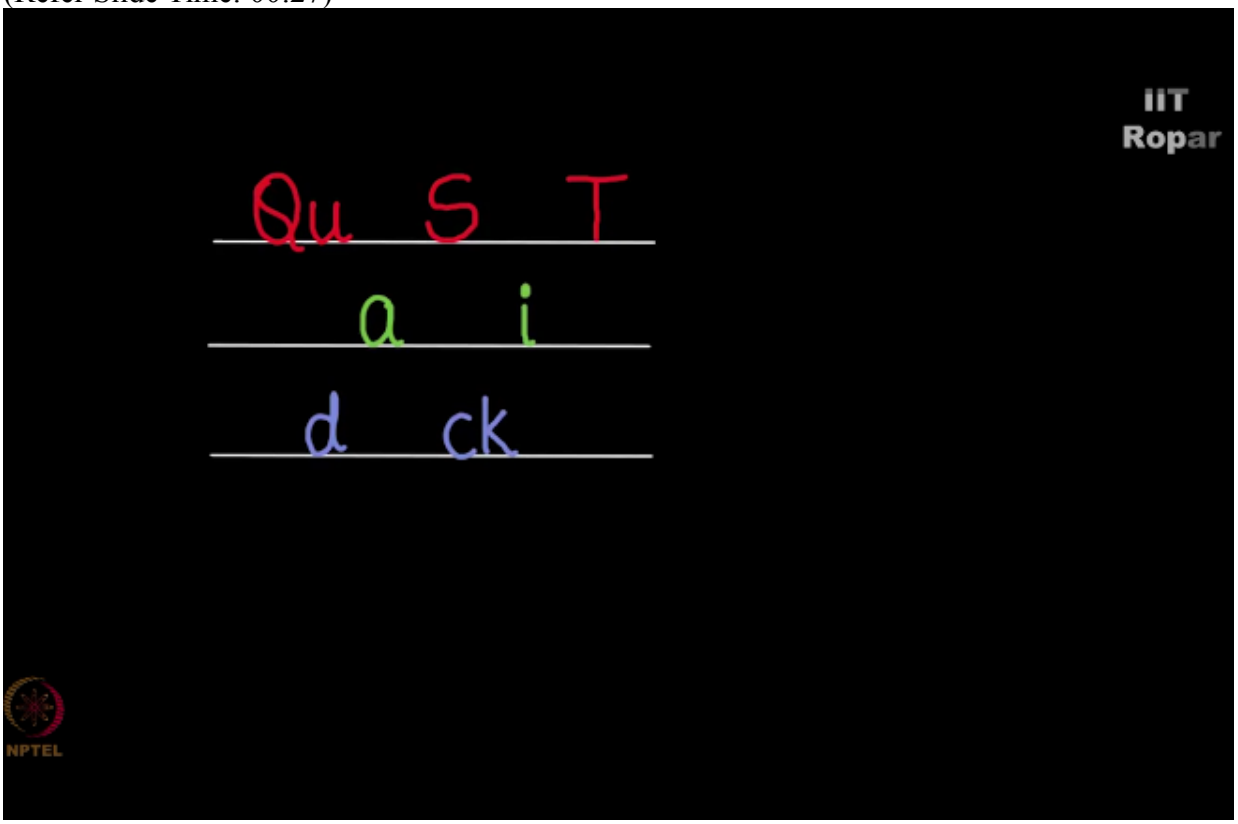

now what you should do is pick one entity per line and create a word, for example you can pick a S here, A here, D here and make a sad,
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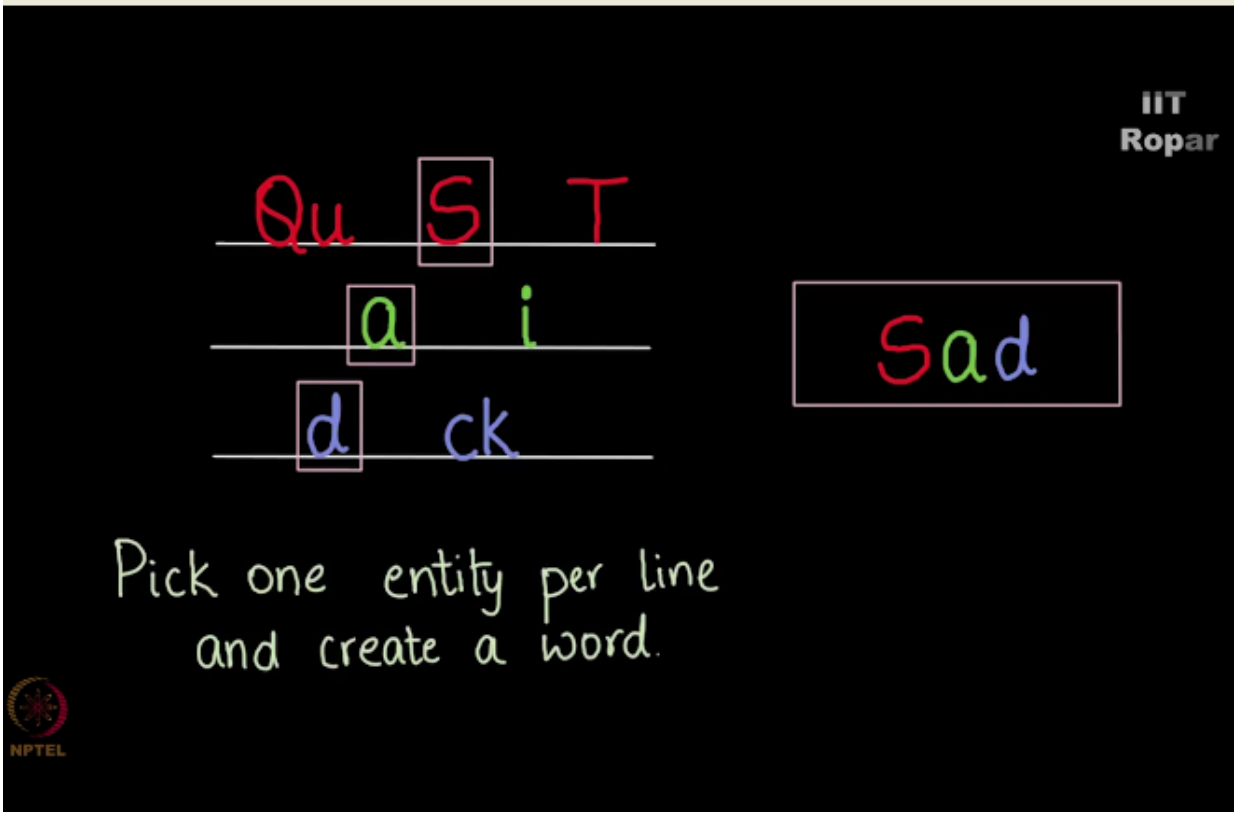

or pick a QU here, A here and D here and make a quad so on and so forth.
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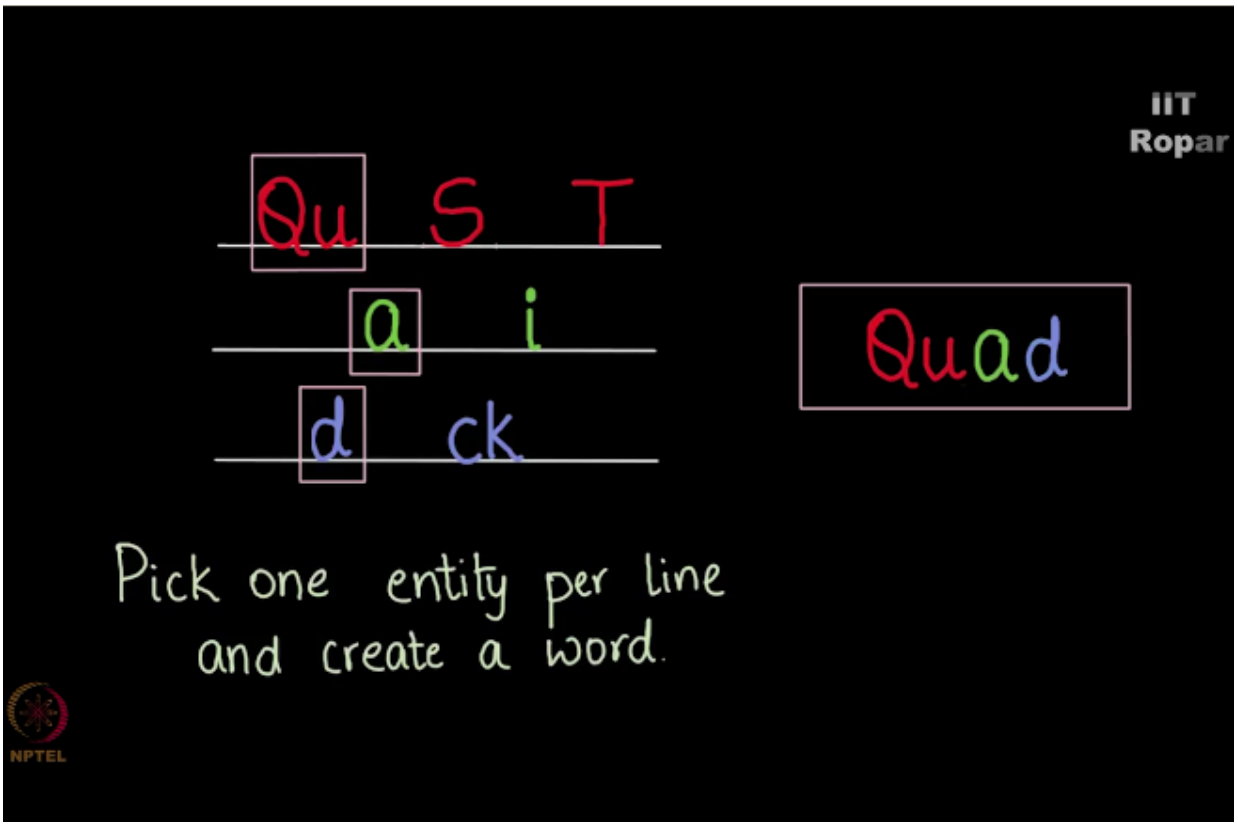

Let us try all possibilities, so let us start from QUAD which makes it quad,

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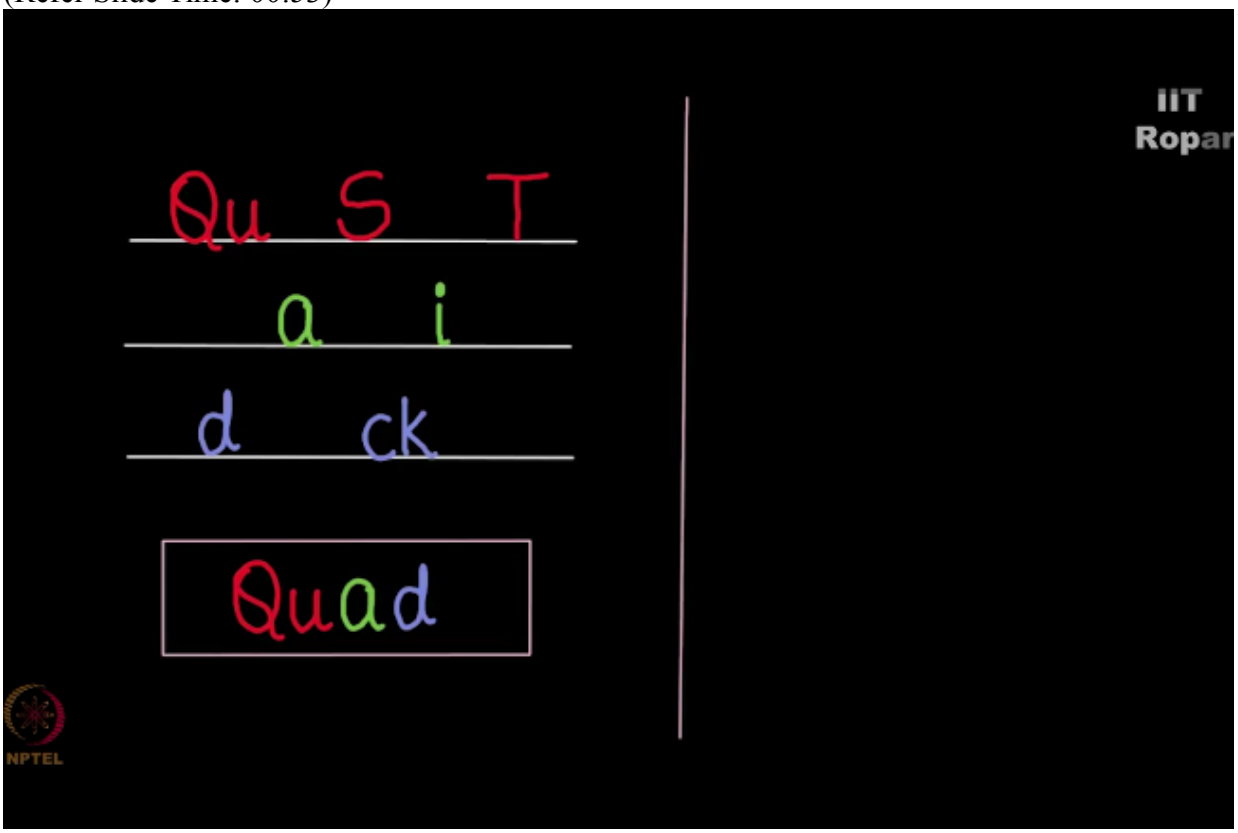

QUACK, which makes it quack
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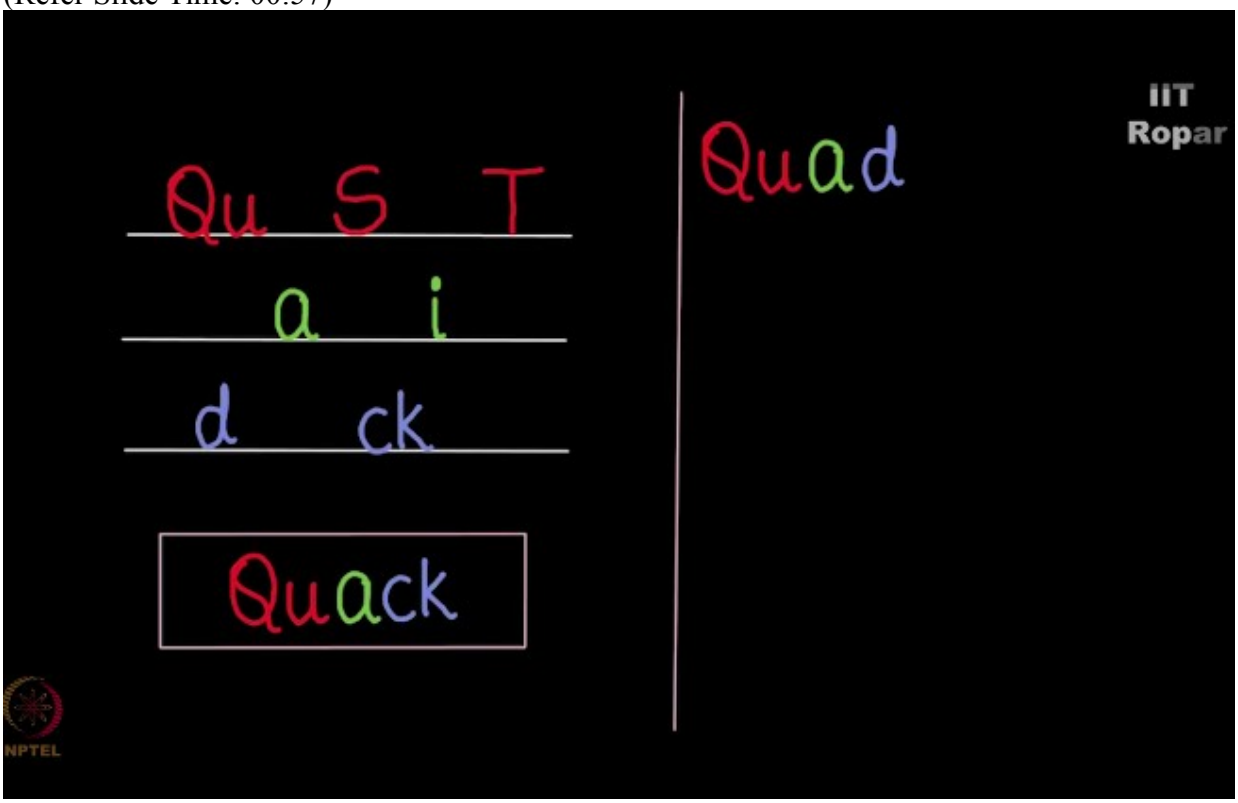

QUID makes it quid,
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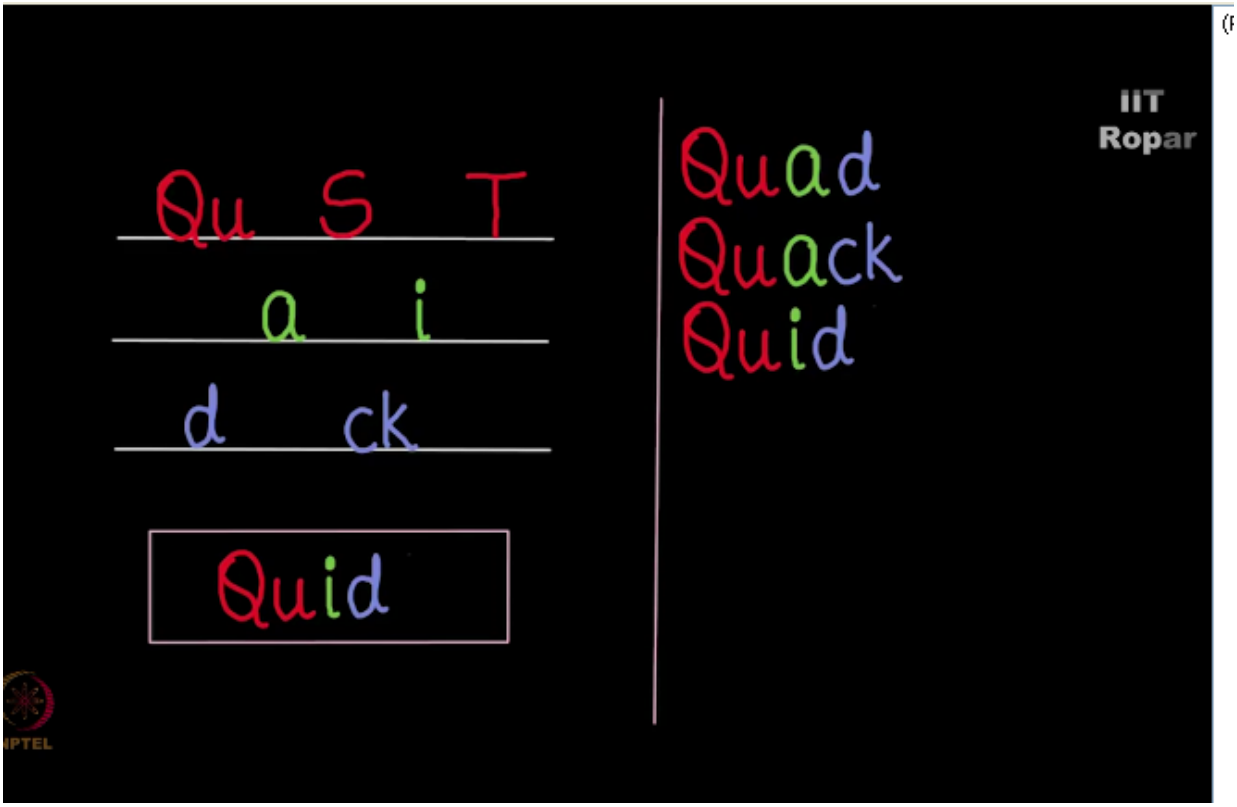

please note you can use only one entity per line, okay and then you have quick, sad, sack, sid, sick, tad, tid, tack, and tick

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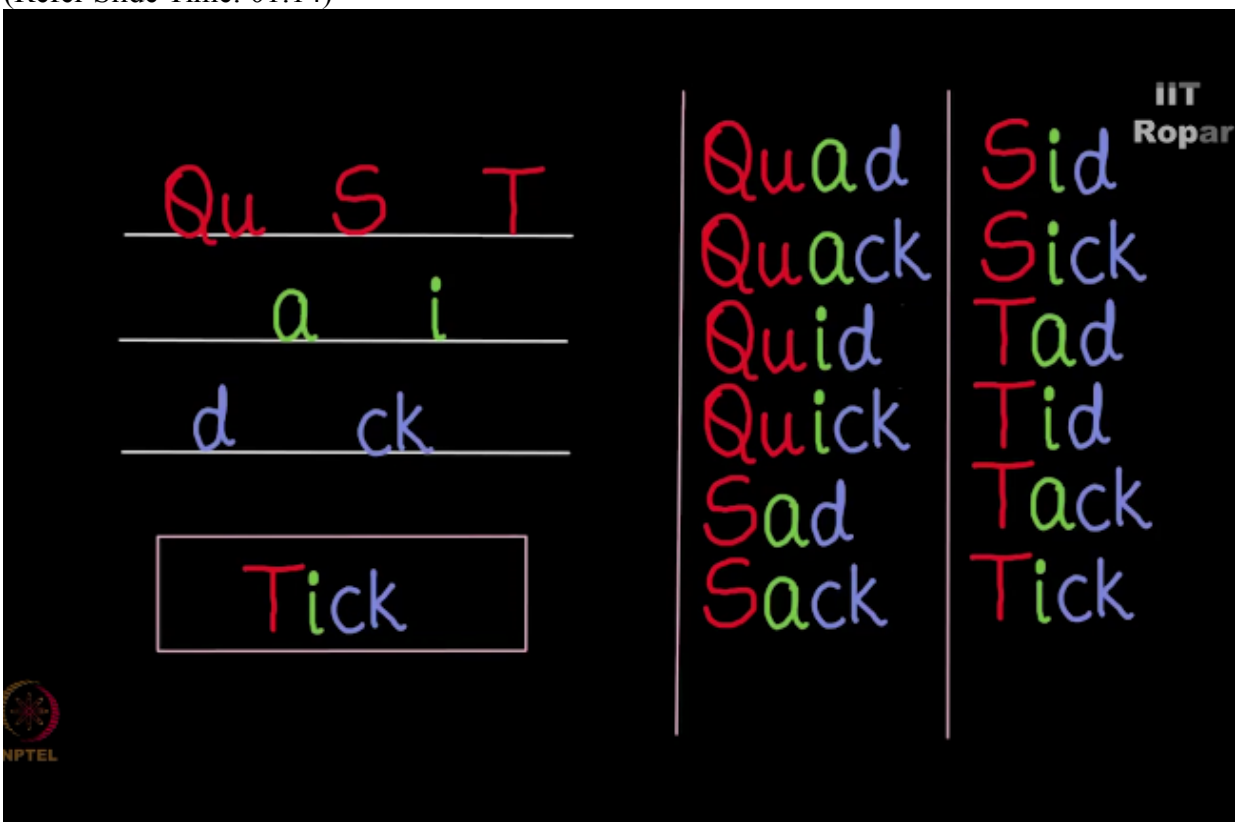

aparts from the words make sense, but in needing necessarily make sense, the question is in how many ways can you create words? Not necessarily valid dictionary ones, but all possible words as you can count here you have created 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 words, right,
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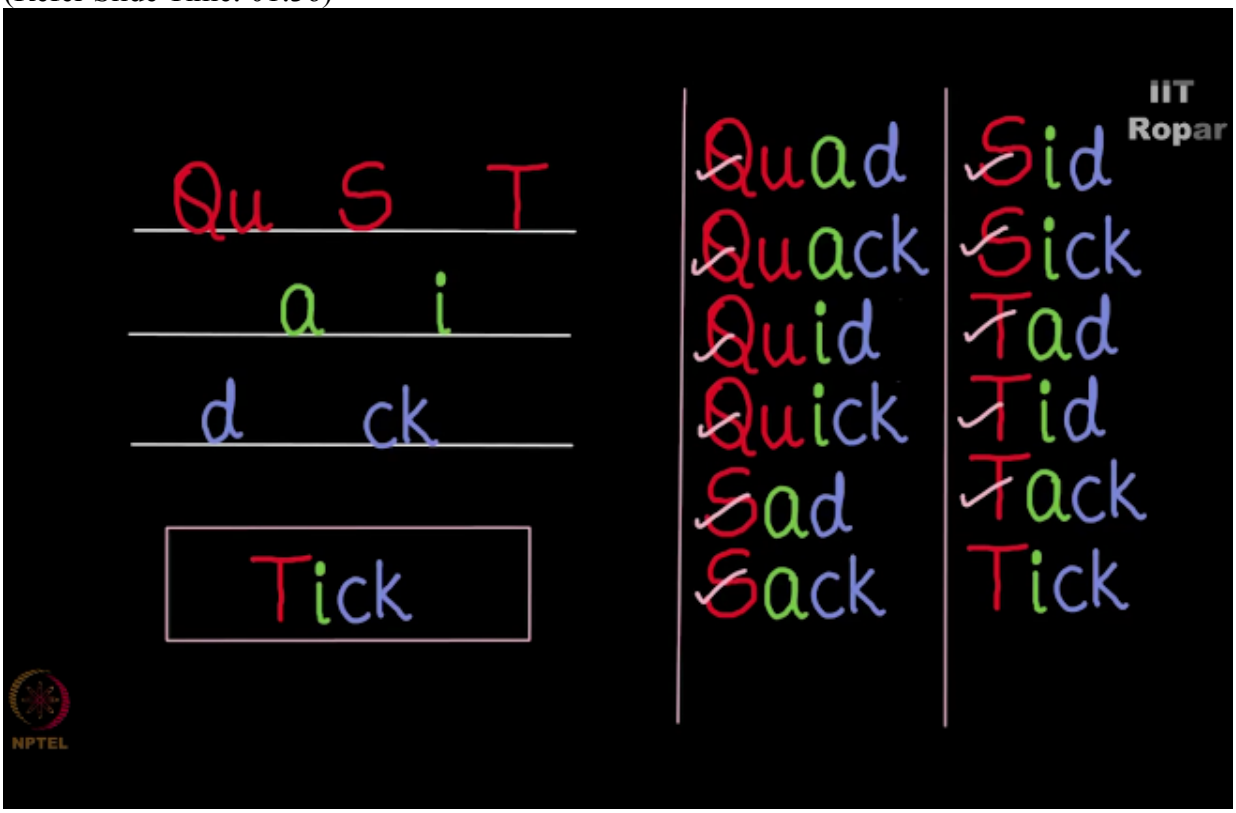

now look at the 3 little words here, how many of them are there? Sad, sid, tad, tid, four of them, look at all the four-letter words, quad, quid, sack, sick, tack, and tick, look at all the 5-letter words quack and quick only two in number.

Now can you tell me a nice way in which we can actually count all possible related words, all possible four-lettered words, all possible five-lettered words, given lines such as these,
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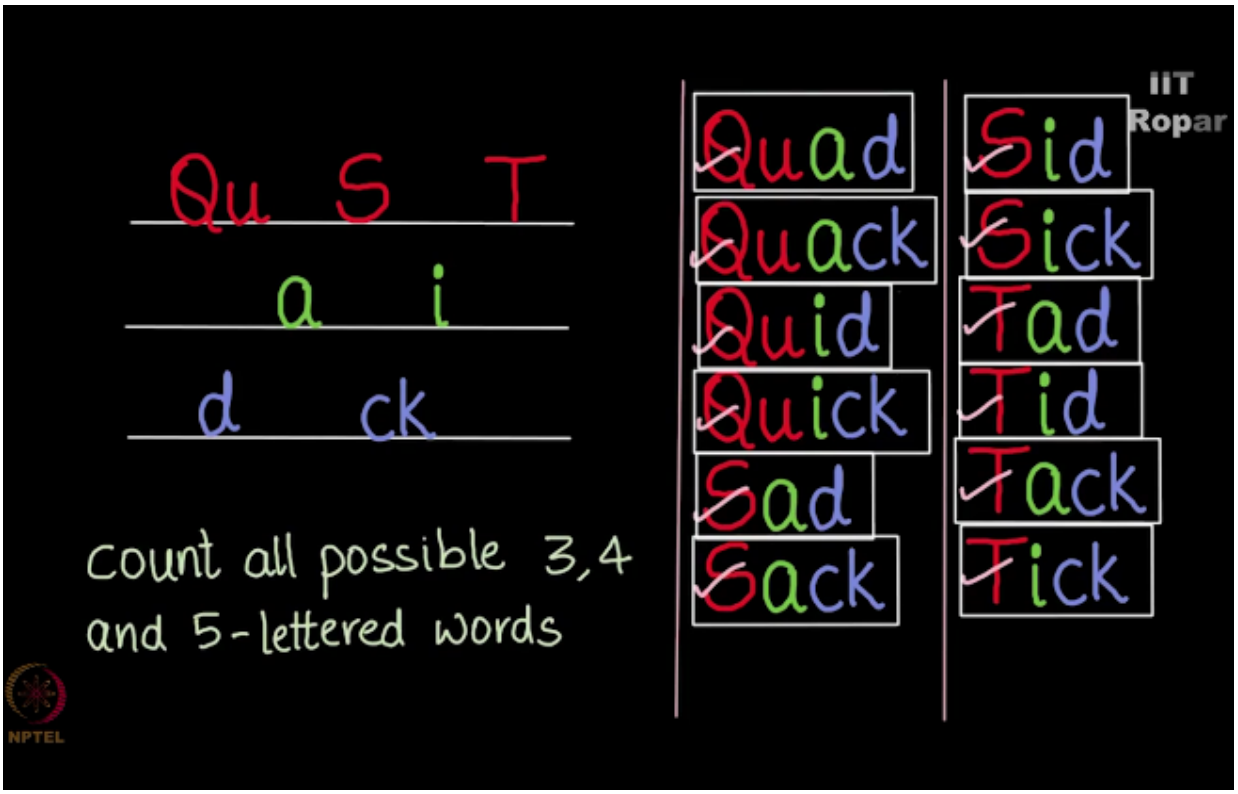

and the constraints like it is in the current problem, think about it, how did four came about? How did 1, 2, 3, 4, 5, 6 ways 4 lettered words came about? And how come there are only two ways of generating a 5 lettered word, what is the math that's going on behind it? Think about it and we'll explain in the forthcoming videos.

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