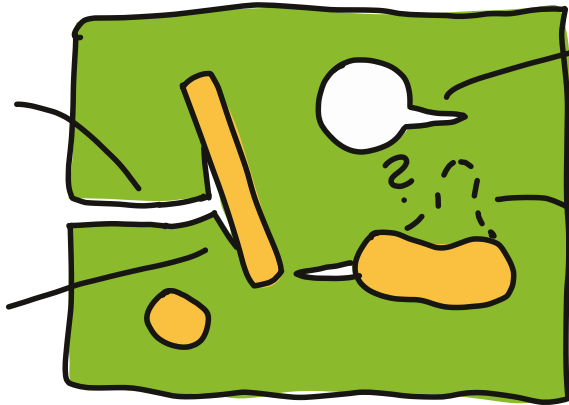


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crack propa-
gation

debonding
(\rightarrow friction)



crack
initiation

optimization