

# (G) Password Confusion (1/3) [10 Points]

Mary, Larry, and Harry are three friends sharing an apartment. Unfortunately, their nosy neighbor Perry is always trying to use their wifi, so Mary changes their wifi password frequently to thwart Perry's efforts. Whenever she changes the password, Mary texts the new password to Larry and Harry.

One day, Mary opens their wifi bill and can tell from the exorbitant charge that Perry has been using it again. Since this can only mean that Perry is somehow reading their texts, Mary hires a company called the Rearranging Expressions Organization (or REOrganization for short) to give her advice on making her messages more secure. REOrganization advises her to send messages that can be decoded by the following 2-step process:

1. Convert the sentence to a question;
2. Read the first letter of each word in the question to yield the password.

As it turns out, Larry and Harry are not very inquisitive people, so they have never encountered questions before. Therefore, Mary gives them the following example messages to show how the system works:

Text message	Text message converted to a question	Decoded password
Deciphering each Alaskan license plate abbreviation is lovely.	Is deciphering each Alaskan license plate abbreviation lovely?	IDEAL PAL
A new German exchange rate beneath a newspaper did assist national ambassadors.	Did a new German exchange rate beneath a newspaper assist national ambassadors?	DANGER BANANA
Every industrial geographer hired through your legal action was yelling enthusiastic random stuff.	Was every industrial geographer hired through your legal action yelling enthusiastic random stuff?	WEIGHTY LAYERS

Why have this extra step of forming a question? The idea is that the initial letters from the original text messages can also spell two-word chunks (DEAL PAIL, ANGER BANDANA, and EIGHTY LAWYERS), so perhaps Perry will be thrown off the scent by these distractor phrases.

**G1.** Larry and Harry both seemed to understand the examples Mary showed them, so she began using this system to encode the new passwords. It went swimmingly for the first few weeks, but then Larry and Harry occasionally began to get the password wrong. On the next page are all of the messages Mary sent out, along with the passwords that her roommates extracted from the messages. A few cells of the table have been left blank; fill them in.



## (G) Password Confusion (2/3)

Text message	Distractor password	Larry's password guess	Harry's password guess	Correct password
Uplifting tales told extremely rapidly in New Guinea and Romania may reveal each storyteller's trade secrets.	UTTERING ARMRESTS	MUTTERING ARRESTS	MUTTERING ARRESTS	MUTTERING ARRESTS
Lively orangutans using discarded branches as tambourines can harmonize.	LOUD BATCH	CLOUD BATH	CLOUD BATH	CLOUD BATH
Horned owls should endure every modern orange tree iguanas can offer next summer.	HOSE EMOTICONS	CHOSE EMOTIONS	SHOE EMOTICONS	SHOE EMOTICONS
Every loud electronic creature that interesting odd numbers should provide at reunions should escape.	ELECTION SPARSE	SELECTION SPARE	SELECTION PARSE	SELECTION SPARE
Alligators that can launch airplanes may prosper.	AT CLAMP	MAT CLAP	CAT LAMP	MAT CLAP
Unions should identify novel geometric systems that one may possibly seek.	USING STOMPS	MUSING STOPS	SUING STOMPS	SUING STOMPS
Happy animals that will investigate telescopes can hop.	HAT WITCH			
All North Dakotan deviled eggs should seem especially radiant today.	AND DESSERT			
Aardvarks may publicly label each spanning tree algorithm talented unicorns should enthusiastically see.	AMPLE STATUSES			
Anyone rabbits might surprise has elicited a response that has satisfied.	ARMS HEARTHS			



## (G) Password Confusion (3/3)

Mary does not want all this confusion about the password scheme, so she switches to a different encoding scheme: She will still send out a message, but her roommates will now need to *negate* the message so that it means the opposite of its original meaning, rather than turning it into a question as previously. Shockingly, Larry and Harry are such positive people that they have never encountered negation before, so Mary sends them the following examples of how the encoding scheme works:

Text message	Negated text message	Decoded password
Charming refrigerator operators will waltz into Greenland.	Charming refrigerator operators will not waltz into Greenland.	CROWN WIG
Quiet utilitarians in crowded Kenyan city halls are talking.	Quiet utilitarians in crowded Kenyan city halls are not talking.	QUICK CHANT

**G2.** Larry and Harry understood these examples just fine, but once again Mary found them making some errors in future weeks when she sent out the actual encoded passwords! The following table contains some of the messages Mary sent out; fill in the blank spaces.

Text message	Distractor password	Larry's password guess	Harry's password guess	Correct password
Denmark's emptiest factory is exporting some pasta Russia is cooking each Saturday.	DEFIES PRICES			
Unions Nepal is forbidding over recent major events during breakfast are keeping exceptional records.	UNIFORMED BAKER			

At this point, Mary decides to simply tell Larry and Harry the passwords in person.

*Note: The problem that these three friends face is that the examples Mary sent out were consistent with multiple possible rules. In linguistics, this type of problem is called the poverty of the stimulus, and it is a central topic in language acquisition: How is it that all children with English-speaking parents learn essentially the same version of English, even though the sentences that they hear are consistent with many possible rules for defining the structure of the language?*

