

1.9

In all,

$$\begin{aligned} P(L_i = l \text{ for some } i \in \{1,2,3,4,5\} | E) \\ = \sum_w P(L_i = l \text{ for some } i \in \{1,2,3,4,5\} | W = w) \\ * P(W = w | E) \\ \dots\dots\dots(1) \end{aligned}$$

Where

$$P(W = w | E) = \frac{P(E | W = w) * P(W = w)}{\sum_{w'} P(E | W = w') * P(W = w')} \dots\dots\dots(2)$$

Where

$$\begin{aligned} P(W = w) = P(w) = \frac{P(E | W = w) * P(W = w)}{\sum_{w'} P(E | W = w') * P(W = w')} \\ \dots\dots\dots(3) \end{aligned}$$

(a)

According to (3)

$$P(W = w) = P(w) = \frac{P(E | W = w) * P(W = w)}{\sum_{w'} P(E | W = w') * P(W = w')}$$

With programming, we can get:

the fifteen most frequent 5-letter words is: SIXTY

the fourteen least frequent 5-letter words is: CLEFT

(b)

According to (1) and (2)

$$\begin{aligned}
 &P(L_i = l \text{ for some } i \in \{1,2,3,4,5\} | E) \\
 &= \sum_w P(L_i = l \text{ for some } i \in \{1,2,3,4,5\} | W = w) \\
 &\quad * P(W = w | E) \\
 &\dots\dots\dots(1)
 \end{aligned}$$

Where

$$P(W = w | E) = \frac{P(E | W = w) * P(W = w)}{\sum_{w'} P(E | W = w') * P(W = w')} \dots\dots\dots(2)$$

With programming

For the situation\_\_-----\_\_

best next guess is: E

probability\_\_0.5394172389647961

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For the situation\_\_-----\_\_EA

best next guess is: O

probability\_\_0.5340315651557583

-----

For the situation\_\_A---S\_\_

best next guess is: E

probability\_\_0.771537162162162

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For the situation\_\_A---S\_l

best next guess is: E

probability\_\_0.7127008416220354

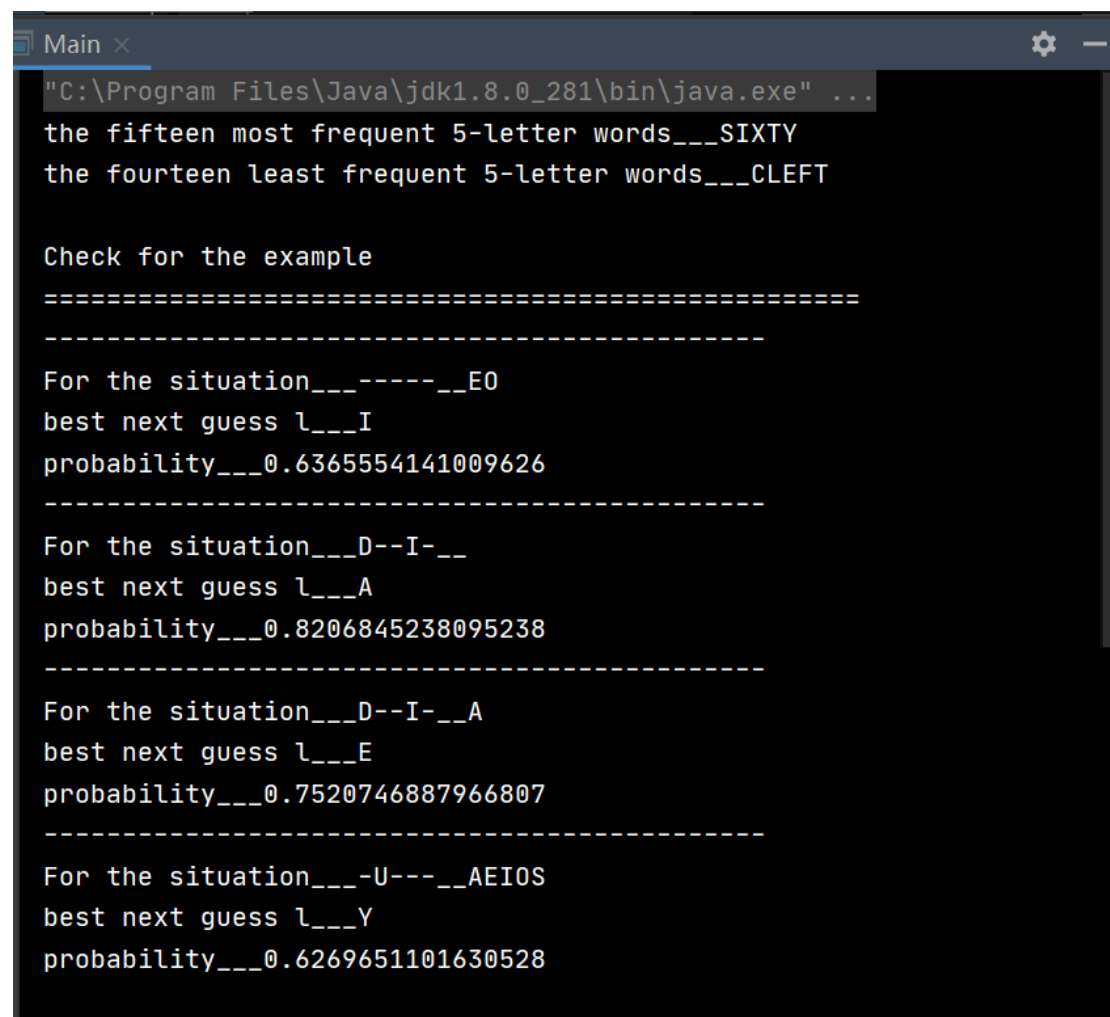
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For the situation\_\_--O--\_AEMNT

best next guess is: R

probability\_\_0.7453866259829711

(c)



```
"C:\Program Files\Java\jdk1.8.0_281\bin\java.exe" ...
the fifteen most frequent 5-letter words__SIXTY
the fourteen least frequent 5-letter words__CLEFT

Check for the example
=====
-----
For the situation__-----_E0
best next guess l___I
probability__0.6365554141009626
-----
For the situation__D--I-__
best next guess l___A
probability__0.8206845238095238
-----
For the situation__D--I-__A
best next guess l___E
probability__0.7520746887966807
-----
For the situation__-U---_AEIOS
best next guess l___Y
probability__0.6269651101630528
```

Here are the answer:

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For the situation\_\_\_-----\_\_

best next guess l\_\_\_E

probability\_\_\_0.5394172389647961

-----

For the situation\_\_\_-----\_\_EA

best next guess l\_\_\_0

probability\_\_\_0.5340315651557583

-----

For the situation\_\_\_A---S\_\_

best next guess l\_\_\_E

probability\_\_\_0.771537162162162

-----

For the situation\_\_\_A---S\_\_I

best next guess l\_\_\_E

probability\_\_\_0.7127008416220354

-----

For the situation\_\_\_--0--\_\_AEMNT

best next guess l\_\_\_R

probability\_\_\_0.7453866259829711

Process finished with exit code 0