1.9

In all,

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

……(1)

Where

$$P(W = w|E) = \frac{P(E|W = w) * P(W = w)}{\sum_{w'} P\left(E\middle|W = w'\right) * P(W = w')}$$ ……(2)

Where

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

……(3)

(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)

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

……(1)

Where

$$P(W = w|E) = \frac{P(E|W = w) * P(W=w)}{\sum_{w'} P\left(E \middle| W = w'\right) * P(W=w')} \text{……(2)}$$

With programming

For the situation___-----__

best next guess is: E

probability___0.5394172389647961

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

For the situation___A---S__I

best next guess is: E

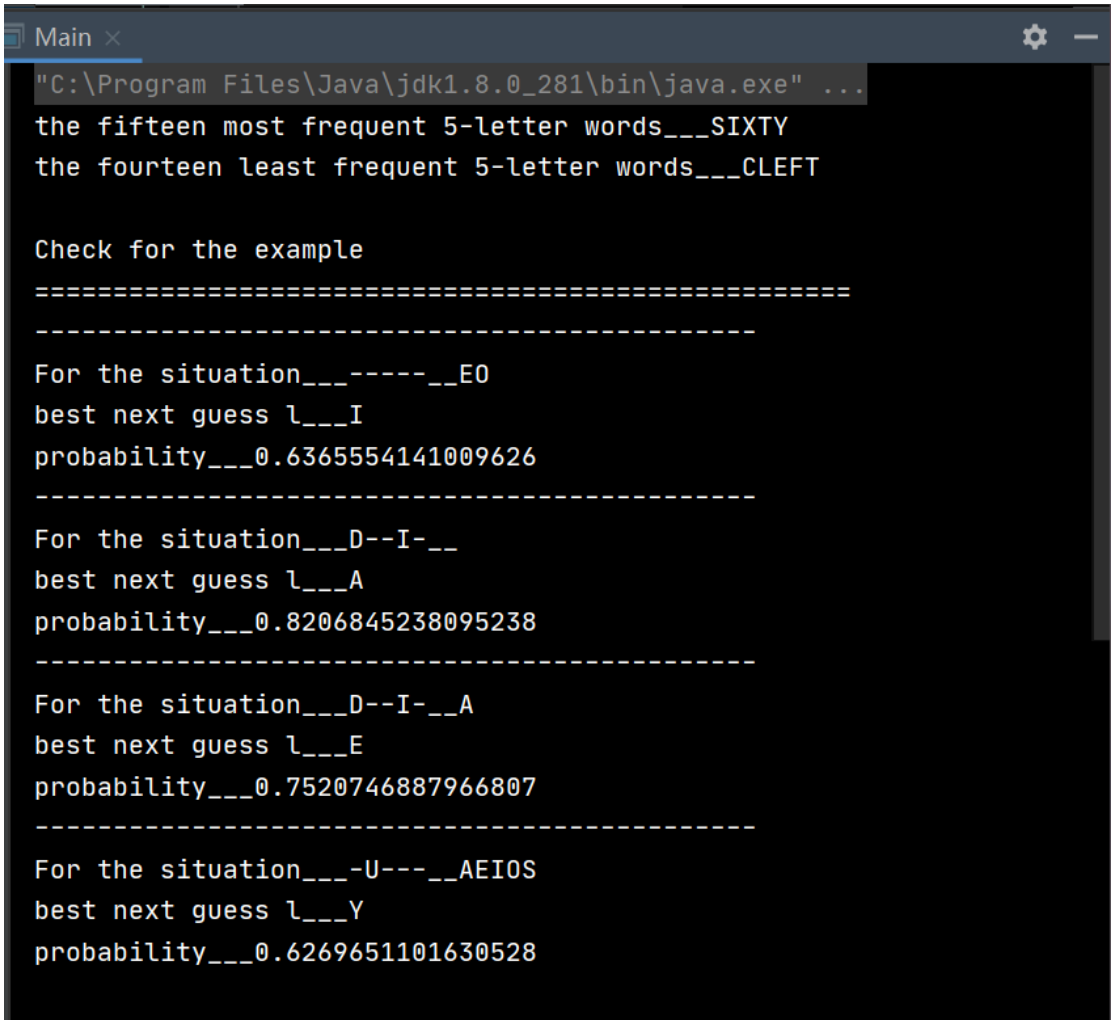
probability___0.7127008416220354

For the situation___--O--__AEMNT

best next guess is: R

probability___0.7453866259829711

(c)



```
Here are the answer:
==================================================
------------------------------------------------
For the situation___-----__
best next guess l___E
probability___0.5394172389647961
------------------------------------------------
For the situation___-----__EA
best next guess l___O
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___--O--__AEMNT
best next guess l___R
probability___0.7453866259829711

Process finished with exit code 0
```