

Excerpts from President Obama's Inauguration Speech, 2013:

Each time we gather to inaugurate a president, we bear witness to the enduring strength of our Constitution. We affirm the promise of our democracy. We recall that what binds this nation together is not the colors of our skin or the tenets of our faith or the origins of our names. What makes us exceptional – what makes us American – is our allegiance to an idea, articulated in a declaration made more than two centuries ago: “We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable rights, that among these are Life, Liberty, and the pursuit of Happiness.”

...

For we, the people, understand that our country cannot succeed when a shrinking few do very well and a growing many barely make it. We believe that America's prosperity must rest upon the broad shoulders of a rising middle class. We know that America thrives when every person can find independence and pride in their work; when the wages of honest labor liberate families from the brink of hardship.

...

We, the people, still believe that every citizen deserves a basic measure of security and dignity. We must make the hard choices to reduce the cost of health care and the size of our deficit. But we reject the belief that America must choose between caring for the generation that built this country and investing in the generation that will build its future.

...

We, the people, still believe that our obligations as Americans are not just to ourselves, but to all posterity. We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations.

...

We will defend our people and uphold our values through strength of arms and rule of law. We will show the courage to try and resolve our differences with other nations peacefully – not because we are naïve about the dangers we face, but because engagement can more durably lift suspicion and fear. America will remain the anchor of strong alliances in every corner of the globe; and we will renew those institutions that extend our capacity to manage crisis abroad, for no one has a greater stake in a peaceful world than its most powerful nation.

...

Our journey is not complete until our wives, our mothers, and daughters can earn a living equal to their efforts. Our journey is not complete until our gay brothers and sisters are treated like anyone else under the law – for if we are truly created equal, then surely the love we commit to one another must be equal as well. Our journey is not complete until no citizen is forced to wait for hours to exercise the right to vote. Our journey is not complete until we find a better way to welcome the striving, hopeful immigrants who still see America as a land of opportunity; until bright young students and engineers are enlisted in our workforce rather than expelled from our country.

1. List all the bigrams occurring in the phrase: "For we, the people, understand that our country"

2. Choose one of the following groups of bigrams (A, B, or C) and compute the bigram probabilities, where for a bigram " $w_1 w_2$ ", this is the probability that  $w_2$  follows  $w_1$  in the corpus. Recall that the definition of the bigram probability (from slide 9 in the lecture), for a bigram " $w_1 w_2$ ",  $P(w_2 | w_1) = \text{count of "w1 w2"} / \text{count of w1}$ .

Here is an example similar to the first group. Suppose that we want to compute the bigram probability of "we bear". We can count to see that there is only 1 occurrence of the bigram "we bear", but there are 21 occurrences of the first word "we". So the bigram probability is the ratio  $1/21$ . (This makes sense because the probability that the word "bear" follows the word "we" in this document is  $1/21$ .) Please leave your answer in the form of the fraction " $1/21$ " and not compute the decimal fraction.

Ignore capitalization in your counting.

A. we ,

we will

we know

B. our people

our journey

C. believe that