

# BIOINFORMATICS TOOL SUITE

Perform DNA nucleotide count, protein secondary structure prediction, codon optimization, and more. Offers functionalities for DNA, protein, and codon optimization analyses. The tool suite ensures reliable, accurate results focusing on usability and performance.



## Step 1

### **DNA ANALYSIS:**

- Calculate A, T, G, C, and GC content counts.
- Convert DNA sequence to protein sequence.
- Display nucleotide count as a data frame.
- Generate reverse and complement of DNA sequence.



## Step 2

### **PROTEIN ANALYSIS:**

- Predict helix, turn, and sheet fractions.
- Calculate counts and frequencies.
- Calculate the protein's molecular weight.



## Step 3

### **CODON OPTIMIZATION:**

- Optimize codons for bacteria or eukaryotes.



## Step 4

### **DATA PROCESSING:**

- Pandas for data manipulation.
- Altair for data visualization.



## Step 5

### **BIOLOGICAL ANALYSIS:**

- BioPython for nucleotide count, translation, molecular weight, and secondary structure prediction.



## Step 6

### **DEPLOYMENT:**

- Deployable on web servers or cloud platforms supporting Python applications.



## Step 7

### **NON-FUNCTIONAL REQUIREMENTS:**

- Performance: Fast sequence processing.
- Usability: Intuitive and user-friendly interface.
- Reliability: Accurate handling of different sequence types.
- Compatibility: Works across various web browsers and platforms.
- Security: Sanitize input sequences to prevent malicious code execution.



## Step 8

### **LIBRARIES USED:**



pandas

Streamlit

biopython