

## ENS-210 LAB3 QUIZ

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**IMPORTANT NOTES:**

You have 20 minutes to finish the quiz.

Cell phones, PCs and smartwatches are NOT ALLOWED.

Please write your answer in the blanks after each question.

At the end of the quiz, you will take a photo of your answers and push them to this week's GitHub repository.

If you do not answer the questions as stated in the answers to the quiz, 25% of the grade for the question will be deducted even if the answer is correct.

1. How would you write a function converting DNA sequence to RNA sequence? (T → U)

```
for (int i=0; i < DNA.length(); i++) {
    if (DNA[i] == "T") {
        DNA[i] = "U";
    }
}
```

2. How would you write a function that returns percentages of four nucleotides (A, C, T, G) of given DNA? (Percentages only contain two decimal points. i.e: 20.33, NOT 20.3276)

```
for (int i=0; i < DNA.length(); i++) {
    int countA=0, countC=0, countT=0, countG=0;
    int countAll=0;
    if (DNA[i] == "A") {
        countA++;
    }
    else if (DNA[i] == "C") {
        countC++;
    }
    else if (DNA[i] == "T") {
        countT++;
    }
    else if (DNA[i] == "G") {
        countG++;
    }
}
```

3. How would you write a function that counts purine and pyrimidine bases in that DNA sequence?

```
countAll = countA +
countC + countT + countG;
return "count A: "
    countA / countAll;
return "count C: "
    countC / countAll;
return "count T: "
    countT / countAll;
return "count G: "
    countG / countAll;
```

4. How would you write a function returning the complementary strand of given DNA?

```
for (int i=0; i < DNA.length(); i++) {
```

```
    if (DNA[i] == "A")
        return "U";
    else if (DNA[i] == "U")
        return "A";
```

```
    else if (DNA[i] == "C")
        return "G";
    else if (DNA[i] == "G")
        return "C";
```



5. How would you write a function returning the reverse complementary strand of given DNA using the function you wrote in 'Question #4'?

```
for (int i = DNA.length() + 1; i-- > 0) {
```

```
    if (DNA[i] == "A")
```

```
        return "U";
```

```
    else if (DNA[i] == "U")
```

```
        return "A";
```

```
    else if (DNA[i] == "C")
```

```
        return "G";
```

```
    else if (DNA[i] == "G")
```

```
        return "C";
```

6. Transcription factors bind certain DNA elements with their DNA binding domains and regulate gene expression. These elements are DNA sequences which may have 5 to 20 base length for eukaryotes. Many of the DNA motifs are known and publicly available now. Also, transcription factor binding motifs can bind to the opposite strand of the DNA if these motifs are present.

How would you write a function that counts the occurrences of the probable motifs?