Part 1

1)

A) I show the results of two different matrixes which are 3 and 7 dimensions.

A screenshot of a computer

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Figure 1 : Part\_1\_a

B) I set the two indexes in both matrices ; however, if indexes of matrixes is written wrong, function prints that is below.

Text

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Figure 2 : Part\_1\_b

2)I implemented addition, subtraction and multiplication functions that take two matrices and return a new matrix with the result which is below.

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Figure 3 : Part\_2\_a

3) I implemented a determinant function that takes one matrix and returns its determinant.

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Figure 4: Part\_3

Part 2)

Q1) Zeros are reserved for no discs and numbers represents diameter of the discs. The figure below shows that initilized Hanoi for N=5. Discs begin in the rod\_0 and they are in order.

A picture containing text, remote, controller, television

Description automatically generated

Figure 5: Part\_1 Q2

Move\_to function has several if-else instructions. Each instruction represents different condition. Before the switch operation destion index of the road increase and after that source value is replaced with 0 and index decreases.

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Figure 6 : Moves of Solving Hanoi with 5 discs

When we look at the code of solve\_hanoi, we can see that there are two recursive function. When each function goes to another recursive function so that it keeps rising with . If we show that with moves, figure 7 can help. Each number doubles with prior one. Therefore we can assume we are correct.

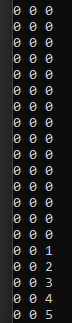


Figure 7 : Solving Hanoi

In this function str pointer increases until null-termination shows up after recursion ends , function prints backwards.



Figure 7: Print Backwards Function output

Q3) If we look at the code , there is no recursion so that we can calculate the complexity by examining the loops. There are two different “while” loops an done of them consists of the other one which means complexity is O(n). The reason is time complexity of program related with outer “while” loop of the function and it is increasing with value of n

I aim to find Nth prime number by finding each one of them until N comes

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Figrue 9 : Benchmark Results

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Figure 10 : Benchmark result of Hanoi without printing move function

If we look at the relation between time intervals we can see that solve\_hanoi function keeps rising with double. So that we can say that we are true and complexity is O(. In addition when we look at the second and thirds result in the figure 9, It can be seen that time sequance changes with linearly;therefore , complexity is O(n) which means we are correct.