WEEK 2 LAB B

Q6.

Step1. Count the sum at even and odd places.

Case a : even sum>odd sum

1. Then player A must start choosing from the right side and should choose all the even placed coins.
2. This will leave the possibility for player B to select only the odd coins. Now, if the player B selects the coin from left hand corner, player A shall select his next coin from left hand corner too. This will give player A two even placed coin. Now, the player B will again be left with only odd positioned coins on either corners. Thus, in next selection, the player A again will get even placed coin, and thus he will win the game.

Case b : even sum < odd sum

1. Then player A must start choosing from the left side and should choose all the odd placed coins.
2. This will leave the possibility for player B to select only the even coins. Now, if the player B selects the coin from right hand corner, player A shall select his next coin from right hand corner too. This will give player A two odd placed coin. Now, the player B will again be left with only even positioned coins on either corners. Thus, in next selection, the player A again will get odd placed coin, and thus he will win the game.

Case c : even sum = odd sum

1. Player A will choose only the odd-placed or only the even placed coins.

Q7. STEP 1. Let us divide the process into rounds. Each round will be completed when the counter will return to initial value.

* Thus, in round 1, all the odd numbers will be left and all even numbered people will be killed. Thus the common difference is equal to 2¹.

**R1):** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99

* Now, in next round, the common difference is equal to 2².  
  **R2:** 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, 41, 45, 49, 53, 57, 61, 65, 69, 73, 77, 81, 85, 89, 93, 97
* The common difference is equal to 2³.

**R3:** 1, 9, 17, 25, 33, 41, 49, 57, 65, 73, 81, 89, 97

* The common difference is equal to 2⁴.

**R4:** 9, 25, 41, 57, 73, 89

* The person 9 will kill person 41. The common difference is equal to 2⁵  
  **R5:** 9, 41, 73
* The common difference is equal to 2⁶  
  **R6:** 9, 73
* Finally person 73 kills person 9.

**R7:** 73

STEP 2. So we can infer, As long as the number is power of 2, the person survived will always be the one who starts. If the number is not power of 2, find the greatest power of 2 which is less than the number i.e. 64 now if 100-64=36 people are killed, the one who will start after that would be the one who will survive.  
36 people will be killed as 2,4,6, …. ,72 and the sword will be handed over to 73 who is the first person to start in remaining 64. thus only 73 will survive.

Q8.

Step 1. De Morgan’s age was x in year x². The square root of the year of his death i.e. 1871, which is approximately 43.25.

Step 2. The square of 43 comes out to be 1849, which will means that in 1849, he was 43 years old.

Step 3. Thus, his year of birth comes out to be 1806.

Step4. Jenkins said that he was 3n years old in the year 3n⁴ .

Step 5. Let Jenkins was born in the year y. Thus, y + 3n = 3n⁴ .

Solving this, we get y(n) = 3n(n³-1) .

Step 6. Using this equation, we use different values of n to find different values of y. At n = 5, we get y = 1860, which seems to be a reasonable answer.

Step 7. Thus, we use n = 5 and thus he was 15 years old (3n) in year 1875(3n⁴).

Step 8. Similarly, he was 2m years old in year 2m² . Thus, we formulate similar equation and get value of m = 31. Thus, he was 62 years old in year 1922.

Step 9. Similarly, he was a²+ b² years old in year a⁴ + b⁴ . Thus, we formulate similar equation, and get values for a and b to be 5 and 6. Thus he was 61 years old in year 1921.

Step 10. Thus, his year of birth comes out to be 1860.

Q9.

1. the order of Client 1 has 1 burger, 3 portions of fries and one ice cream  
   Start the fries (They will take 5 mins). While the fries are in progress, one of them can make Ice Cream (2 mins) and another can start on Burger. After 5 mins are over, Burger still needs 5 minutes more. So, the order will be prepared in 5 + 5 = 10 mins in total. So, the order will be served at 10:10.
2. the order for client 1 got completed at 10:10. The order for client will start at 10:10. Fries will take 5 mins and while the fries are getting prepared, Ice cream can be prepared by one of them. So, in total it will take 5 mins to process the order for Client 2.We will start the order for Client 3 at 10:15. We will start with the fries first, while the fries are being prepared, one of them can start with Burger. Burger takes 10 mins, so after the fries are prepared, it will take additional 5 mins for the burger to get prepared. So, in total in total it will take 10 mins for the processing of the order of Client 3. By 10:25, order of Client 3 will be prepared.
3. The order for Client 2 will be served by 10:10. Even, Client 1 will get its order by 10:10 (because of burger).

RED COLOURED ITEMS IS DONE BY ANISH.

0 2 5 7 10

Fries1,burger1 fries1, fries2, burger2, fries3,

Icecream1 burger1 icecream2 fries2 burger2

1. As per the timeline, one person will be idle during 2-5, 10-15 and 15-17.

So, 3+5+2 = 10 minutes. Exactly one person will be idle for 10 minutes.

RED COLOURED ITEMS IS DONE BY ANISH.

0 2 5 7 10 15 17

Fries1, burger1 fries1, fries2, burger2, fries3, burger2 FINISH

Icecream1 burger1 icecream2 fries2 burger2