problem - 0 Aim. To implement the Fibonacci Sequence and debug the function for (tib(5)) I los summes took of The Second recursive call on the (0) and a X= Fib (n) 5. FILED. WHICH & serviced from tibe OF = a ti April astrong a constant 1 = = a +3 metun 1 retuen fib (n-1) tfib(n-2) Ap(a) will situary O Step-1: To get fib(5) Herre 4th o) rapided [ The first recursive call is fib(4) The Second recurive coul fib(3) (1) of this : (c) of the Step-2: For Fib(4), which & recieved from fib(5) The first recueive call fib(3) The second recusive call & fib(2) 7. fb(1) which get born Ab(3) returns T Step-3 Pib(3), w The first seemsive call & fib(2) The second securite call es fib(1). 476(3) = 476(2) + 476(1)

46(D) = 1+1 = 2

Am To implement the Fibonacci (2) dit ce pagel The first recurive call attibal it nothing and The second recursive call a fib(0) 5. fib(i), which is served from tib(s) on 1 -fib(1) returns 1. 6. fibro, which is seleived from tible) tib(o) will return 0 Step-1: Toget fib(6) Hence, fib(1) returns 1 fibio) returned of the avience test all The Second recurring coult fibes) fib(2) = fib(0) + fib(1) Step-2: For Fib(4) gratucting an aved from the [] The first recurring call= 11+03=) (est) The second securing carres (Ables) 7. fib(1), which got from fib(3), returns 1. Step-3 - pib(3), w So we contray that a sure brown of fib(3) = fib() + fib(1) fib(3) = 1+1=2

8 fib(2), got from fib(4) Time Complexity of Fibou It returns fib(1) and fib(0) [: fib(1)=1 fib(2) we can say that 4-6(4)=2+1=3 q. fib(3), which a received from fib (7) It returns fib(2) and fib(1) The time complexity of fibonacci & O(27) -fib (e) = returns fib(i) and fib(o) Fib (1) 3 (vetuens 1) and fiber returns 0 of mose summye calls to From this we can say that -fib(s)=3+2=5 To secursion thee grows exponentially making i metriciant Etel William volume of m fibes) calls fiber + fibes) The ways to immovered Fiberitaci Implementation frb(4) (all fib (3) + fib(2) Memoiziation fib(3) colly fib(2) and fib(1) Amethod to optimize the fibonacci by win fib(2) (all fib() + fib(o) - sione

Abla) got from Abla) Time Complexity of Frbonacci Cold 1= (Dolt ) (add ban (Ddit Lauter to The time complexity is O(3"), His an PILE 30 Which designed been the polar Time Complexity what bookerden white The time complexity of fiboracci & O(3) He an exportential inthe cold It is because each call to fiben) generates two of male lemistre Calls to -fib(m+1) and fib(m-2) 1+ mont The recursion tree grows exponentially, making it inetticient for large valer of n this colle this + this) The ways to improvency fiborateci Implementation Memorization: titis) could abled and title! A method to optimize the fiboracii by using memoization, which sover previously calculated.

Side the aucy a sorted we can bake one ele fibonacci Values in a table. This avoids the sedundant computations and recluded the time complexity e mult take the ment element for (m) o array and then compare agains Iterative Approach Analysmy the approach worst care complered in this method, fiboracci numbers are computed in a loop rather than recusion . This achieves ocm) time complexity with OCD space complexity. Time Complexity. problem-1 Time Complexity and a lawrent 19 part Complexity would be Oco) To take elements and store it in one array, we can assume a time complexity of O(NTK), then have sorted the away based on merge suit. So overal/ time complexity & OCNK) + OCNKlogn) = O(NKlog(NK)) oth space, and time efficient as only Improved Approach bom and bow a posses topa the cutput. So I assure the ap Since each away & seted could have used a min beap that would return smallest element in constant time :

Since the array a sorted we can take one element from each away and compare the first element of the array. After finding the smallest element We mut take the next element from the same array and then compare again. Trenotive Approach tralysing the approach would case complexity ( ockelloge) men in model body on 2 id 1 loop souther than similar . This artist of a) with the tomplant worldwar problems and problem-2: Time Complexity: Array a traveral & done only once so time Complexity would be Ocn) To toke element and some it in one array , Improved Approachtured man sout a mulio could you think of any other approach as this es both space and time efficient, as only once away is used, have modified the imput away to form the output. So, I assume the approach es efficientis para o pour dons son? heap that would setum emailed element to the was some sant that