# Marks Allocation:

Best Case: T(n) = O(n) --------------------------------------- 1 mark

Worst Case: Correct T(n) equation --------------------------------------- 1 mark

T(n) = O(n2) --------------------------------------- 0.5 mark

One line explanation --------------------------------------- 0.5 mark

void method (int n)

{

int\* B=new int[n+1]; ---------------------------------------- 0.5 mark

for (int i=n; i >0; i=i/3) ----------------------------------- 0.5 x 3 mark

B[i]=0; ---------------------------------------- 0.5 mark

int j = 0; ---------------------------------------- 0.5 mark

while ( j < n ) ---------------------------------------- 0.5 mark

{

if(B[j] == 0) ---------------------------------------- 0.5 mark

{

for (int k = 1; k <= n; k = k \* 3) ----------------------------------- 0.5 x 3 mark

B[k]++; ---------------------------------------- 1 mark

}

j++; ---------------------------------------- 0.5 mark

}

}

# Solution:

|  |  |
| --- | --- |
| **Statement** | **Number of times executed** |
| int\* B=new int[n+1] | 1 |
| i=n | 1 |
| i>0 | log3n + 1 |
| i/=3 | log3n |
| B[i]=0 | log3n |
| j=0 | 1 |
| while (j<n) | n+ 1 |
| if(B[j] == 0) | n |
| int k = 1 | log3n |
| k < = n | log3n(log3n) |
| k =k\* 3 | log3n(log3n) + log3n |
| B[k]++ | log3n(log3n) |
| j++ | n |
| **Total** | **1 + 1 + log3n + 1 + log3n + log3n + 1 + n + 1 + n + log3n + log3n(log3n) + log3n(log3n) + log3n + log3n(log3n) + n**  **T(n) = 5 + 5 log3n + 3n + 3 log3n(log3n)**  **T(n) = O(n)** |