Kingdom of Saudi Arabia
Ministry of Education
College of Computer
Department of Information Technology

Qassim University

Course: CS 211 "Concepts of Algorithms"
Semester 452
Instructor: Dr. Fethi Fkih

Midterm Exam
Duration: 50 minutes
Section: 3255

Student Name: Mark /35 Student ID:

For Instructor use only

Outcomes	1	2	3	4	5	6
Course covering Outcomes	√	√				

Question	1	2	3	4
Covered Outcome	1	1	2	2
Allocated mark	5	10	4	8
Earned mark				

Total		
1	2	exam
15	12	35

Question1 [5 marks]:
Fill in the following table with the growth rate name of each function

Function	Growth Rate Name
C	
Log N	
N	
N^2	
N^3	
2^N	

Question2 [2*5=10 marks]:
Determine the total cost and the complexity (Big O) of the following codes

Code	Cost	Times

for (int i = 0; i < n; i++) {
  if (arr[i] == target) {
  return i;
  }
}		

Total Cost		
Complexity		

```
for (int i = 0; i < n - 1; i++) {
    for (int j = 0; j < n-i-1; j++) {
        if (arr[j] > arr[j + 1]) {
            // Swap arr[j] and arr[j+1]
```

`int temp = arr[j];`
`arr[j] = arr[j + 1];`
`arr[j + 1] = temp;`
`}`
`}`
`}`		

Total Cost		
Complexity		

`int i = 1;`
`while (i < n) {`
`printf("%d ", i);`
`i *= 2;`
`}`
`printf("\n");`		

Total Cost		
Complexity		

`int addition(int x, int y) {`
`return x + y;`
`}`		

Total Cost		
Complexity		

`for (int i = 0; i < N; i++) {`
`for (int j = 0; j < N; j++) {`
`res[i][j] = 0;`
`for (int k = 0; k < N; k++) {`
`res[i][j]+= mat1[i][k]*`
`mat2[k][j];`
`}`
`}`
`}`		

Total Cost		
Complexity		

Question3: [4 Marks]

If an algorithm takes 2 seconds to run with the problem size 8, what is the time requirement (approximately) for that algorithm with the problem size 16?

- If its order is:

O(1) → T(n) =

O($\log_2 n$) → T(n) =

Question 4: [8 Marks].

Apply the *selection sort* on the following sequence:90, 100, 70, 30,99,1. In each pass give the number of comparisons.

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	Number of comparisons