CMPSC 465 Assignment 02

Shi Qiu

TOTAL POINTS

26 / 40

QUESTION 1

1 Problem 2 10 / 10

- **- 2 pts** part 1 incorrect
- **- 2 pts** part 2 incorrect
- **- 2 pts** part 3 incorrect
- **- 2 pts** part 4 incorrect
- **- 2 pts** part 5 incorrect
- **- 1.8 pts** part 1 "I don't know how to answer this question"
- **- 1.8 pts** part 2 "I don't know how to answer this question"
- **- 1.8 pts** part 3 "I don't know how to answer this question"
- **- 1.8 pts** part 4 "I don't know how to answer this question"
- **- 1.8 pts** part 5 "I don't know how to answer this question"
- ✓ **- 0 pts** **All correct**

QUESTION 2

2 Problem 3 10 / 10

- ✓ **+ 2 pts** **Part 1: Finds the correct running time to merge two arrays.**
- ✓ **+ 2 pts** **Part 1: Provides the correct final answer.**
- ✓ **+ 2 pts** **Part 2: Identifies the size and the number of sub-problems that can result in a more efficient algorithm.**
- ✓ **+ 2 pts** **Part 2: Provides the correct merging time for each recursion.**
- ✓ **+ 2 pts** **Part 2: Provides the correct running time for the improved algorithm.**
- **+ 0.6 pts** 10% - Part 2
- **+ 0.4 pts** 10% - Part 1
- **+ 0 pts** No explanation or analysis and wrong answer(s).
- **+ 0 pts** Part 1: Wrong Answer
- **+ 0 pts** Part 2: Wrong Answer

QUESTION 3

3 Problem 4 5 / 10

- **+ 5 pts** Analyzed the function find-pivot in the right direction
- **+ 3 pts** since this is a analysis question and your answer is correct we expect to get more explanation and thought process
- **+ 3 pts** Provided a correct recurrence
- ✓ **+ 2 pts** **Provided the answer**
- **+ 1 pts** Provided a some correct recurrence
- ✓ **+ 2 pts** **since this is a analysis question we expect to get more explanation and though process**
- ✓ **+ 1 pts** **10% option**
- **+ 0 pts** Incorrect answer no submission
- **+ 0 pts** the recurrence is incorrect or no recurrence
- **+ 4 pts** some of the analysis in correct direction
- **+ 6.5 pts** late policy more with correct run time, slightly error recurrence and correct direction analysis but expect more explanation
- **+ 0 pts** late policy more than 2 hr
- **+ 2 pts** late policy more with correct run time, slightly error recurrence and correct direction analysis but expect more explanation
- **+ 1.5 pts** Click here to replace this description.

Click here to replace this description.

- **+ 0 pts** Click here to replace this description.

QUESTION 4

4 Problem 5 1 / 10

- **+ 3 pts** identified 3 possible cases.
- **+ 3 pts** Analysed/explained crossing sum(case 3)
- **+ 2 pts** Provided proper recurrence.

+ **2 pts** solved the recurrence for time complexity.

+ **4 pts** correct runtime analysis without master theorem. Using any other methods.

✓ **+ 1 pts went for 10%**

+ **0 pts** incorrect/ unanswered

+ **1 pts** partial credit for procedure

+ **6 pts** Used correct algorithms/methods but outside of the existing rubric.

Problem 2

Points:

1. $\Theta(n^3 logn)$
2. $\Theta(n^3.5)$
3. $\Theta(n^4)$
4. $\Theta(nlog^2 n)$
5. $\Theta(n^{3.5} log^3 n)$

1 Problem 2 **10 / 10**

- **2 pts** part 1 incorrect
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- **2 pts** part 3 incorrect
- **2 pts** part 4 incorrect
- **2 pts** part 5 incorrect
- **1.8 pts** part 1 "I don't know how to answer this question"
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- **1.8 pts** part 5 "I don't know how to answer this question"

✓ **- 0 pts All correct**

Problem 3

Points:

1. the first time merging first two arrays will cost n+n time and total length will be 2n

the merging of third in to the first two will cost 2n+n time and total length will be 3n

so until the last, it will cost (m-1)*n+n time and total length will be mn

if we add them tougher, it will cost $O(n * m^2)$

2. if we use divided and concur which introduced in class, we split the array in to half every time it will be near linear$O(mlogm)$, and total will cost $O(n * mlogm)$

2 Problem 3 10 / 10

✓ **+ 2 pts** **Part 1: Finds the correct running time to merge two arrays.**

✓ **+ 2 pts** **Part 1: Provides the correct final answer.**

✓ **+ 2 pts** **Part 2: Identifies the size and the number of sub-problems that can result in a more efficient algorithm.**

✓ **+ 2 pts** **Part 2: Provides the correct merging time for each recursion.**

✓ **+ 2 pts** **Part 2: Provides the correct running time for the improved algorithm.**

+ 0.6 pts 10% - Part 2

+ 0.4 pts 10% - Part 1

+ 0 pts No explanation or analysis and wrong answer(s).

+ 0 pts Part 1: Wrong Answer

+ 0 pts Part 2: Wrong Answer

Problem 4 **Points:**

for the pivot function here, we first divided into n/3 and calculate the medians, then divided in to n/9 and return selections

total run time is $\Theta(n)+\Theta(n/3*log3)+\Theta(n)+\Theta(n/9*log9)$

for n/3:

$M=n/3$

$A1>M/2+M/2=2*M/2=M=n/3$

$A2>M/2+M/2=2*M/2=M=n/3$

$a=1/3b=2/3a+b=1$

$T(n)=\Theta(nlogn)$

for n/9:

$M=n/9$

$A1>M/2+4*M/2=5*M/2=M=5n/18$

$A2>M/2+4*M/2=5*M/2=M=5n/18$

$a=1/9b=13/18a+b<1$

$T(n)=\Theta(n)$

and use master theorem to have $T(n)=\Theta(n^3logn)$

3 Problem 4 5 / 10

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+ **3 pts** since this is a analysis question and your answer is correct we expect to get more explanation and thought process

+ **3 pts** Provided a correct recurrence

✓ **+ 2 pts** **Provided the answer**

+ **1 pts** Provided a some correct recurrence

✓ **+ 2 pts** **since this is a analysis question we expect to get more explanation and though process**

✓ **+ 1 pts** **10% option**

+ **0 pts** Incorrect answer no submission

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+ **1.5 pts** Click here to replace this description.

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Problem 5

Points:

no idea

4 Problem 5 1 / 10

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+ **3 pts** Analysed/explained crossing sum(case 3)
+ **2 pts** Provided proper recurrence.
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