Write the following SQL queries. (5 points each)

1. Display a list of all instructors, showing their ID, name, and the number of sections that they have taught. Make sure to show the number of sections as 0 for instructors who have not taught any section. Your query should use an outer join, and should not use scalar subqueries.

SELECT instructor.id, instructor.name, COUNT(teaches.id) sections\_taught  
FROM instructor  
LEFT OUTER JOIN teaches on teaches.id = instructor.id  
GROUP BY instructor.id, instructor.name

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1. Write the same query as above without using join.

SELECT instructor.id, instructor.name, (SELECT COUNT(teaches.id) FROM teaches WHERE instructor.id = teaches.id)  
FROM instructor

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1. Display the list of all departments, with the total number of instructors in each department, without using scalar subqueries. Make sure to correctly handle departments with no instructors. Use a different outer join than you used in the first question.

SELECT department.dept\_name, COUNT(DISTINCT instructor.id)  
FROM department  
FULL OUTER JOIN instructor ON department.dept\_name = instructor.dept\_name  
GROUP BY department.dept\_name

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1. Retrieve the names of all instructors who work in the department that has the employee with the highest salary among all instructors.

If there is an edge case where two instructors from different departments both share the max salary, I elected to limit this to just one department. Alternatively, one might want to pull dept\_name and the instructors from both departments, depending on the use case.

SELECT instructor.name  
FROM instructor,  
 (SELECT instructor.dept\_name  
 FROM instructor  
 WHERE instructor.salary = (SELECT MAX(instructor.salary) FROM instructor LIMIT 1) dept  
WHERE instructor.dept\_name = dept.dept\_name

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1. Retrieve the names of instructors who make at least $10,000 more than the instructor who is paid the least in the university.

If you make $10,000 more than *anyone*, you meet this criteria.

SELECT DISTINCT ins1.name  
FROM instructor ins1, instructor ins2  
WHERE ins1.salary >= (ins2.salary + 10000)

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