CSE102 Online
Topic: Structure, Pointer
Set: B

Problem 1

You are given the following C structure definition to store 2D points.

```
struct Point
{
   double x;
   double y;
};
```

Define the following structures:

- **Define a new structure Circle**: A circle can be defined by a center, which is a 2D point, and a radius.
- **Define a new structure Rectangle**: A rectangle (axis-parallel) can be defined by its top-left and bottom-right coordinates, which are 2D points.

Implement the following two functions:

a) **double area_rect(struct Rectangle r):** this function returns the area of the rectangle.
b) **int rect_inside_circle(struct Circle c, struct Rectangle r):** this function returns 1 if the rectangle r is inside the circle c; otherwise returns 0. Assume that if all four corner points of a rectangle are inside a circle, then the rectangle is also inside the circle. Note that inside also includes the case when points fall on the perimeter of the circle.

Input: Three real numbers representing a circle (first two numbers are center coordinates) following by four real numbers representing a rectangle (first two numbers are coordinates of top-left corner)).

Output: Area of rectangle (up to two decimal point) and the text “Inside” or “Not inside” if the rectangle is inside the circle or otherwise.

Write a main function to take user inputs and produce outputs as per the following format.

Input	Output
0 0 5 -5 5 5 -5	Area of rectangle: 100.00 Not inside
0 0 1 -0.7 0.7 0.7 -0.7	Area of rectangle: 1.96 Inside
0 0 1 -0.71 0.71 0.71 -0.71	Area of rectangle: 2.02 Not inside

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Problem 2

Implement the following function:

char * construct(char * s, char * t)

The function constructs a new character string (with proper dynamic memory allocation) that can be obtained by removing every character from the string s that matches with any of the characters of the string t. The function should return a pointer to the newly constructed string. All memory addresses should be allocated dynamically for all character strings. You must use pointer syntax for all accesses of character strings. You cannot use any library function from string.h except strlen.

Write a main function to take user inputs and produce outputs as per the following format. Note that the output is an empty string for the third case.

Input	Output
BAUEFT FAX	BUET
CSE EEE	CS
EEE CSE	