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Algorithms Assignment 10

Section 1 Question 1:

Let’s assume the algorithm is not optimal.

Greedy Algorithm = 10a + 5b + c;

We will represent the optimal algorithm with 10a’ + 5b’ + c’

If the algorithm is more optimal than our greedy algorithm then a > a’

So, a’ must be at most a-1 which means 10 cents are made up by the other coins

Our new solution is a’ + 1 + b’ – 2 + c’

This solution gives n cents and uses less coins than our optimal solution, contradicting the fact it is optimal.

Therefore, our greedy algorithm must be optimal.

Section1 Question2:

Pseudocode:

greedyLines(Lines[] lines, start, end); //lines is our from the problem, an array of line objects that have start and end attributes, start and end represent 0 and 10.

Int op = 0; //will be filled with optimal product

Boolean endReached = false;//denotes when we find the end of the line

Int currentStart = start;

Int currentEnd = Integer.min\_value;

While(currentEnd < end)

For i in lines

If(currentStart >= lines[i].start && lines.end > currentEnd)

currentEnd = lines[i].end

end if

end for

currentStart = currentEnd;

op++;

end while

return op

end method