



```
def patternLeftJoin(graph, partialResult, pattern):  
    cols, leftData = partialResult  
    totalCols = calNewColumns(cols, pattern)  
    patternToLeft = matchingVarMapping(pattern, cols)  
    result = []  
    for leftRow in leftData:  
        lookup = modifyPattern(leftRow, patternToLeft, pattern)  
        for rightRow in graph.resolvePattern(lookup):  
            result.append(leftRow + rightRow)  
    return (totalCols, result)
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<b>?recipe</b>	<b>?name</b>	<b>?i</b>	<b>?i</b>	<b>:unit</b>	<b>:cups</b>
:mayo	“Mayo”	:m1	:m1	:unit	:cups
:mayo	“Mayo”	:m2	:c4	:unit	:cups
:mayo	“Mayo”	:m3	:c6	:unit	:cups
:cake	“Cake”	:c4			
:cake	“Cake”	:c5			
:cake	“Cake”	:c6			
:cake	“Cake”	:c7			