

CS431: Assignment-3 Report

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Question 3

a) Algorithm devised to solve the problem

The algorithm devised is a recursive algorithm. First, a list of dimensions for each room is generated with the given ranges. Now for every dimension in the list of a particular room, there are two options, either keep this dimension or pick a dimension from the remaining list elements. Dimensions are compared at each step of the recursion and the one with the larger area used is chosen.

When all the dimensions for each room have been selected then check if these dimensions follow the constraints which are: kitchen should not be larger than hall and bedroom, bathroom should not be larger than kitchen and the total area should not be greater than the given area.

b) Number of functions used

A total of 15 functions are used to recurse over all the dimensions and utility functions to check constraints and print the design.

c) Are all those pure?

Yes, all the used functions are pure. No function changes the state of any variable outside the function.

d) Why?

No input was required from the user to find the design and no global states were required. Thus all the functions are pure and there are no side effects of any function.

Short Notes

a) Lazy evaluation is one of the significant advantages of functional programming

ie. values are only calculated when needed. It speeds up computation overlooking the computations that might not be needed for the task at hand. Yes, the lazy evaluation can be used for better performance in the solutions. For example, in problem 2, the list of permutations of the teams is quite big and is not

needed in every function. Using lazy computations it is only calculated when a new random fixture is needed.

- b) Lack of side effect property of Haskell has various advantages. Lack of side effects makes the code more modular as a pure function does not change any global states or values. The function works exclusively with users' input. As there are no state or variable changes by a function, given a particular input, the output is always the same which makes the debugging of the code easier. Lack of side effects also make the functions more reusable.