
Algorithm 1: find_best_split

```
1 Function find_best_split(X[][], gradients[], curr_depth)
2   // determine node privacy budget
3   if params.use_decay then
4     if curr_depth == 0 then
5       node_budget =  $\frac{\text{tree\_budget}}{2 * (2^{\text{max\_depth}+1} + 2^{\text{curr\_depth}+1})}$ 
6     else
7       node_budget =  $\frac{\text{tree\_budget}}{2 * 2^{\text{curr\_depth}+1}}$ 
8   else
9     node_budget =  $\frac{\text{tree\_budget}}{2 * \text{max\_depth}}$ 
10  // construct the node
11  TreeNode *node = new TreeNode(candidates[index])
12  return node
```

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