

Challenge January 2023

Christmas Model created by [ChatGPT](#)

A solution with OPL CPLEX by Alex Fleischer
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OPL (Optimization Programming Language) is an algebraic modeling language that helps model easily optimization problems that can be solved both with IBM CPLEX linear programming and IBM CPLEX constraint programming CPOptimizer (CPO)

Optimization can help any kind of business, which includes for sure choosing gifts.

With OPL CPLEX CPOptimizer we can write a very simple model that could help you next time you have some time off.

NB: You can use free CPLEX Community Edition for this.

You get

```
Alice will get Flowers  
Bob will get Wine  
Carol will get Book  
Dave will get Chocolate  
Eve will get Flowers
```

```
Total Happiness : 24
```

With the OPL CPLEX CPOptimizer model

```
using CP;

{string} PEOPLE= {"Alice", "Bob", "Carol", "Dave", "Eve"};
{string} GIFTS ={"Book", "Toy", "Chocolate", "Wine", "Flowers"};
range rGIFTS=0..card(GIFTS)-1;

int GIFT_COSTS[rGIFTS]=[ 10, 20, 5, 15, 7];

int HAPPINESS[rGIFTS][PEOPLE]=
[[3, 2, 5, 1, 4],
 [5, 2, 4, 3, 1],
 [1, 3, 4, 5, 2],
 [2, 5, 3, 4, 1],
 [4,3,1,2,5]];

int BUDGET=50;

// each person can only receive one gift
dvar int whichGift[PEOPLE] in rGIFTS;

dexpr int KPI_HAPPINESS=sum(p in PEOPLE) HAPPINESS[whichGift[p]][p];

maximize KPI_HAPPINESS;

subject to
{
    // total cost of the gifts must be less than or equal to the budget

    sum(p in PEOPLE) GIFT_COSTS[whichGift[p]]<=BUDGET;
}

execute
{
    for(var p in PEOPLE) writeln(p," will get ",Op1.item(GIFTS,whichGift[p]));
    writeln();
    writeln("Total Happiness : ",KPI_HAPPINESS);
}
```