

Operations Research Software Test Retake

December 19, 2025

Four royal families will visit Buda castle next summer: The royal families of Algeria, Britian, China and Denmark. We are planning to hold a banquet and are preparing dishes for it. We want our guests to enjoy their time at the banquet, so we conducted some research to figure out how much each family enjoys certain dishes. We are planning to serve the following dishes during the banquet: Avocado Toast, Barbecue, Cheese Cake, Donuts, Egg Salad, Fish Sticks & Goulash. We have scored how much each royal family enjoys these dishes from 1 to 10, where 1 means they hate the dish, 10 means they love the dish:

		Avocado Toast	Barbecue	Cheese Cake	Donuts	Egg Salad	Fish Sticks	Goulash
enjoyment =	Algeria	8	7	3	4	5	8	10
	Britian	6	8	6	7	2	5	6
	China	1	6	5	6	7	9	5
	Denmark	5	7	8	4	7	8	6

Each member of each royal family will require at least **2000** calories on the banquet. Each royal family has the following number of members:

	Algeria	Britian	China	Denmark
members =	7	12	16	5

The total enjoyment of a family is the sum of the enjoyments of each member for each serving of a dish they eat. For example, if all 6 members of the royal family of Algeria eat 2 servings of Avocado Toast and 3 servings of Donuts, then their total enjoyment is $6(2 \cdot 8 + 3 \cdot 4) = 168$. We will assume each member of each family eats the exact same dishes. Each serving of a dish contains the following amount of calories:

	Avocado Toast	Barbecue	Cheese Cake	Donuts	Egg Salad	Fish Sticks	Goulash
calories =	180	226	321	295	220	316	250

We have the following amount of dishes available that we can prepare for the banquet (in servings):

	Avocado Toast	Barbecue	Cheese Cake	Donuts	Egg Salad	Fish Sticks	Goulash
available =	25	55	28	42	64	51	38

Additionally, for **1** royal family, we will provide wellnex benefits. Due to burning fewer calories, if a royal family receives wellnex benefits, the total calorie requirement of the family will reduce by **4500**.

Formulate the problem in an XPress Mosel program!

- Create variables for how many servings of each dish will be prepared for each royal family, and which family receives wellnex benefits!
- Make sure exactly one family receives wellnex benefits!
- Calculate the total calorie amount that each royal family receives!
- Make sure the total calorie amount each royal family receives is at least **2000** times the number of members for each non-wellnex family, and **4500** less for the wellnex family!
- Make sure the total amount of dishes prepared overall is at most the amount available!
- Maximize the total enjoyment of the royal families!

Print out how many servings of each dish is prepared for each family & which family gets wellnex benefits!

All above tables are available from the `banquet.dat` data file on the website.

Send your solution (.mos file) to `pfeiferd@math.bme.hu`.

Title your e-mail "ORPL Test Retake - NAME, NEPTUN", where NAME is your name, and NEPTUN is your Neptun code. Include your name in the Mosel file name, and the Mosel file you created.