

Name:

## Model-based Decision Support

Exam 4 (home assignment) Enrolment number:

Till May 4, 2017

The Management of the chain of stores Doberhams has taken the following 3 Outputs and 2 Inputs as crucial for efficiency measuring of their branches:

(O) Sales (unit sold articles)

(I) Employees (full time equivalent)

(O) Total Revenue (unit £)

(I) Sales Area (unit 100 m<sup>2</sup>)

(O) Profits (unit £)

Data collection yields the following operating figures:

| Store       | (I) Employee | (I) Area | (O) Sales | (O) Revenue | (O) Profits |
|-------------|--------------|----------|-----------|-------------|-------------|
| Doberhams A | 14           | 20       | 700       | 6000        | 700         |
| Doberhams B | 18           | 15       | 1000      | 12000       | 1700        |
| Doberhams C | 20           | 2X       | 800       | 11000       | 1900        |
| Doberhams D | 25           | 1Y       | 1200      | 23000       | 2600        |
| Doberhams E | 12           | 9        | 900       | 18000       | 4000        |
| Doberhams F | 16           | 2Z       | 1200      | 12000       | 3200        |
| Doberhams G | 13           | 32       | 1400      | 14000       | 3100        |

For X use the last digit of your student enrolment number, Y the last but one digit, and Z the last but two (If X=4, then 2X is 24).

Use MS Excel Solver and DEA to compute **CCR-efficiency** of these branches of Doberhams (input-oriented). For one of the necessary seven optimization runs, copy your spreadsheet to a piece of paper. Additionally, describe **verbally** (i.e. in words) which branch operates efficiently and which not. Your submission should be handed in at next class on May 4<sup>th</sup>, 2017.

You find many tutorials and videos in the web that explain how to use MS Excel Solver. E.g.

<https://www.ablebits.com/office-addins-blog/2016/06/22/how-to-use-solver-in-excel-with-examples/>

<https://www.youtube.com/watch?v=xQTFwQAJz5g>

(In case that you don't have access to MS Excel or if you prefer it, you can program this problem in GAMS instead of using MS Excel Solver).

**IMPORTANT: There is no class on April 27<sup>th</sup>, 2017; I am not available to answer questions in the last week of April, because I am out of town attending a project meeting.**

The next written exams are on May 11<sup>th</sup>, and May 18<sup>th</sup>, 2017.