Academie Creative Technology
HBO-ICT

## EXAMPLE Test: Helpdesk

At a big company all employees can request for help using a service desk. Those requests (tickets) regard any problems that employees can have with their workplace and are either software or hardware problems.


The system keeps track of all employees. An employee has a username and a password (saved in plain text). There are regular employees (they can create tickets) and there are service desk employees (they can resolve those tickets). For all employees, the system also saves at what department the employee works. For service desk employees, the system also keeps track of the expertise of the given service desk employee.

Everybody can create tickets in the system (this happens in this test by just adding code to the main method). For the created ticket, the system creates a unique number. The date of the ticket and the employee who created the ticket are also saved. Furthermore, the ticket has a description of the problem. For a hardware problem, the code of the machine has to be saved (this is an integer). For a software problem, the name of the software is saved.

Tickets can be solved by a service desk employee. When a service desk employee solves a ticket, the service desk employee is saved in that ticket. Also a short description of the fix is saved.

**Please note:** You don't have to make a menu or other user interfaces for the system. All employees that are going to use the system can write their own C++ code so a main that calls the written methods is enough. See the included main.cpp file for details.

**Please note**: Also check the other side of this paper!

### The steps to build the system

- Design the system on a piece of paper. Think of all the classes and their attributes and methods. Draw a class diagram of the best solution. We can already tell you you'll need inheritance for that. Apply as much of the things you learned as you can. You don't have to turn in the design.
- Check the main.cpp thoroughly to check what your system eventually has to be capable of. One of those functionalities will be reading a file. This file is included and may not be modified. You can open the file using the filename 'input.txt'.
- Write the needed classes. Make sure your classes have correct output() methods, the output method writes the classes to 'std::cout'.
- Write the Helpdesk class.
- **Please note:** Make sure that by the end of the program all allocated memory gets deallocated when the program finishes!. You should not leak any memory when the program terminates.
- **Please note:** Every class should have its own header file and cpp file. You should split out the functionality into different header and cpp files, so it is not allowed to put all source code in a single cpp file!

## Some hints for along the way

Because figuring out what to do can be tough, we have provided some additional hints so that you can see if you're still going in the right direction:

- Test often. The Application should be calling methods on some kind of Administration class and you should print the results. Only implement the items that are asked within the TODO comments as this will ensure that your solution matches the output provided below.
- Stuck on a specific part? Try to work "around" the problem so you can still receive marks for the final product. Feel free to comment what part you were stuck on and how you tried to solve it.
- As a reminder, realise we grade your product on:
    - Functionality and readability of the code
    - Proper class design (overall), the implementation of the individual classes and the proper use of inheritance and access specifier
    - Splitting the functionality into different header and cpp files
    - The use of STL algorithms and data-structures
    - The correct usage of exceptions
    - Correct allocation and deallocation of memory
    - Correct usage of method/function arguments (by-value, by-reference, by-address) and declaration of method const when possible.

## Example output

Here you'll see some possible output of the requested application:

```
Employees:
  ruud (IT Lecturers)
  jeroen (IT Lecturers)
  hesther (Management)
  gerralt (Helpdesk, Expertise: Mice)

Tickets:
  Ticket 1 (Softwareticket, Application: Office 365):
    Status: Open
    ruud (IT Lecturers): Excel can't calculate the number of days in a year

  Ticket 2 (Hardwareticket, computerId: 5):
    Status: Solved
    jeroen (IT Lecturers): My mouse doesn't work!
    gerralt (Helpdesk, Expertise: Mice): Try putting it into the USB port instead of the HDMI
port.

  Ticket 3 (Softwareticket, Application: MacOS X):
    Status: Solved
    ruud (IT Lecturers): MacOS won't boot on my system
    gerralt (Helpdesk, Expertise: Mice): Please replace your Dell laptop with a real system
```