Computer Science

Loughborough University

17COA256: Object-oriented Programming
Coursework Assignment

Dr Lars Nagel Semester 2

Task

You are to develop an administration tool for a pet shop in Java. The shop buys and sells pets. Each pet is of a certain species and sex (male / female); it has a given name (e.g. a dog could be called “Molly”) and a main colour, it has a price and is either *available* or *sold*; the date of arrival at the pet shop and the selling date are recorded. The date format is yyyy-mm-dd, e.g. 2018-01-13 for the 13th January 2018.

The species is given by the common name, e.g. dog, but also by its scientific classification. The pets are categorized using a reduced biological taxonomy consisting of *class* (e.g. Mammalia), *order* (e.g. Carnivora), *family* (e.g. Canidae), *genus* (e.g. Canis) and *species* (e.g. Canis lupus). Classes, orders etc. can have their own attributes. In the requested implementation reptiles (Reptilia) have the additional attribute “venomous”, and parrots (Psittaciformes) have the additional attribute “talking”.

Two months after its arrival at the pet shop, the price of an animal is reduced by 10%. Another two months later, the price is reduced to 80% of the original price.

The program should include at least the species listed in Appendix A. An example list of pets is shown in Appendix B.

Functionality The following functionality is to be implemented and described in the documentation which must have a short section about how the functionality can be used via the user interface.

- **add animals** ... allows to add a list of animals provided in a file; each line in the file describes one animal by the following attributes, separated by commas: *given name*, *common name*, *price*, *sex*, *main colour*, *arrival date*, *selling date*. The selling date is optional; if it is left out, then the animal is not yet sold. If the arrival date is also left out, then the current date is used as the arrival date. (An example file is given in Appendix B.)
- **add animal** ... allows to add a single animal with the parameters *given name*, *common name*, *price*, *sex*, *main colour*, *arrival date*, *selling date*. Again, if it the selling date is left out, then the animal is not yet sold. If the arrival date is also left out, then the current date is used.
- **sell animal** ... changes the status of an animal to *sold* and saves the date the animal was sold.
- **write animals** ... outputs a file of all animals grouped into sold and unsold and sorts the former by the selling date and the latter by the day of their arrival. The format is the same as the input format with the exception that every animal must have an arrival date.
- **search** ... outputs a list of all available animals
  - that have the given name, common name, sex and / or main colour chosen by the user and / or
  - that are of the user-specified class, order, family, genus or species and / or
  - whose number of legs is between a user-specified minimum and maximum and / or
  - which are venomous / non-venomous or can talk / not talk (where applicable).
- **compute revenue** ... computes and outputs the revenue of the specified day or month, that is the sum of the selling prices of the animals sold on that day or in that month.

The program should be able to avoid and detect errors. Examples: (i) The user should be notified if she wants to sell an animal that is already sold. (ii) It should be possible to add multiple animals of the same species and the same attributes (for instance: two male goldfish called “Donald” and whose price is £10.23) and sell them individually.

User Interface You must provide a user interface. It should be a graphical user interface. A command-line interface will be accepted, but score less points.

Design and Implementation

Before you start programming, design your software and structure it in an object-oriented way. Identify classes and their attributes and methods, think about how they interact with each other, and design the user interface before you produce any code.

Note that this is an individual exercise and that you must not share any code.

You can use an IDE such as Eclipse or BlueJ to develop the program. But the program must compile and run from the command line and thus outside of any such environment.

Submission

You are expected to submit a documentation, all files needed to compile and run the program and a jar file `petshop.jar` that is executed by the command `java -jar petshop.jar`. All files need to be zipped into a single zip file called

```
coursework_petshop_<your first name>_<your last name>.zip
```

and submitted electronically via Learn. The coursework should be handed in with appropriate documentation. In the document include a class diagram, an overview of the functionality completed and not completed, a description of how to run the program, explain your design decisions and summarize how you have evaluated and tested the program.

The hand-in date is Wednesday, 16th May 2018, 2:00pm.

Marking

Your software will be marked with respect to functionality as well as object-oriented design. The following is a very rough guide how the assignment will be marked.

- Object-oriented design & documentation: 40%
  - Object-oriented design: 25%
  - Documentation & testing: 15%
- User interface: 15%
- Functionality: 45%
  - add, sell and print functions: 25%
  - search and revenue functions: 20%

The following requirements are absolutely essential. If any of them is not fulfilled, the coursework will not pass.

- The code must compile and run.
- The jar file containing the program must run calling `java -jar petshop.jar`.
- The implemented functionality is usable via an interface.

- There is sufficient documentation on how to use the interface.
- The documentation contains a section with a class diagram describing the object-oriented design of the program.

A Species

The program should include at least the species in the following box where each species is given as a comma-separated list. Mammals, fishes and birds that are not parrots are given in the form `common name, class, order, family, genus, species, number of legs`; reptiles have the extra attribute `venomous`, parrots the extra attribute `talking`.

```
Dog, Mammalia, Carnivora, Canidae, Canis, Canis lupus, 4
Cat, Mammalia, Carnivora, Felidae, Felis, Felis silvestris, 4
Rabbit, Mammalia, Lagomorpha, Leporidae, Oryctolagus, Oryctolagus cuniculus, 4
Golden Hamster, Mammalia, Rodentia, Cricetidae, Mesocricetus, Mesocricetus
auratus, 4
Roborovski Hamster, Mammalia, Rodentia, Cricetidae, Phodopus, Phodopus
roborovskii, 4
Guinea Pig, Mammalia, Rodentia, Caviidae, Cavia, Cavia porcellus, 4
Edwards's Fig Parrot, Aves, Psittaciformes, Psittaculidae, Psittaculirostris,
Psittaculirostris edwardsii, 2, not talking
Norwegian Blue, Aves, Psittaciformes, Psittacidae, Mopsitta, Mopsitta tanta, 2,
talking
Hyacinth Macaw, Aves, Psittaciformes, Psittacidae, Anodorhynchus, Anodorhynchus
hyacinthinus, 2, talking
Yellow Canary, Aves, Passeriformes, Fringillidae, Crithagra, Crithagra
flaviventris, 2
Goldfish, Actinopterygii, Cypriniformes, Cyprinidae, Carassius, Carassius auratus,
0
Koi, Actinopterygii, Cypriniformes, Cyprinidae, Cyprinus, Cyprinus rubrofuscus, 0
Common Barbel, Actinopterygii, Cypriniformes, Cyprinidae, Barbus, Barbus barbus, 0
Boa Constrictor, Reptilia, Squamata, Boidae, Boa, Boa constrictor, 0, not venomous
Corn Snake, Reptilia, Squamata, Colubridae, Pantherophis, Pantherophis guttatus,
0, not venomous
Black-necked Spitting Cobra, Reptilia, Squamata, Elapidae, Naja, Naja nigricollis,
0, venomous
```

B Example List

The following comma-separated list of animals is in the correct format. The *given name* is followed by *common name*, *price*, *sex*, *main colour* and possibly *arrival date* and *selling date*. If there is no selling date, then the animal has not been sold. If the arrival date is also left out, then the current date is used as the arrival date.
The first animal, for example, is a male rabbit named “Walter” which arrived at the 1st December 2017. It is grey and the price is £39.50.

```
Walter, Rabbit, 39.50, male, grey, 2017-12-01
Bunny, Rabbit, 34.60, female, white, 2017-12-01
Dude, Rabbit, 32.20, male, light brown, 2017-11-04
```

```
Aristotle, Dog, 104.80, male, black, 2017-11-01
Molly, Dog, 140, female, brown, 2018-01-02
Cajus, Dog, 188, male, light brown, 2017-10-04, 2017-10-14
Polly, Norwegian Blue, 65.50, female, blue, 2017-10-04
Kaa, Boa Constrictor, 311, male, brown, 2017-12-01
Medusa, Black-necked Spitting Cobra, 129.99, female, black, 2018-01-13
Mr Crowley, Black-necked Spitting Cobra, 114.75, male, black, 2018-01-13
Nagini, Corn Snake, 89.90, male, red, 2017-12-01
Laura, Common Barbel, 18.97, female, bronze, 2017-12-01
Victoria, Yellow Canary, 20.02, female, yellow
Teresa, Cat, 67.95, female, black, 2017-12-01
Heisenberg, Hyacinth Macaw, 103.56, male, blue, 2018-01-02
Felix, Edwards's Fig Parrot, 27.80, male, green, 2018-01-02
Indira, Koi, 9.45, female, red, 2018-01-02
Molly, Golden Hamster, 24.90, female, brown, 2018-01-02, 2018-01-15
Donald, Goldfish, 10.23, male, orange
Miss Bubbles, Goldfish, 10.23, female, orange
```