

Assignment 6

60-322

Abstract factory pattern

Consider the problem of writing a tax processing program which handles the case of calculating the provincial taxes for Ontario and Quebec. The application is on the web and works as follows:

- 1) Display an object of the JFrame class as given below. The supplied application gives the actual code I used. You do not need to pay a lot of attention to the code since it is not relevant to the task you have. I have not attempted to deal with other details (such as error handling). Fig 1 shows the initial frame displayed.
- 2) The user has to fill in all details and press *Enter* after supplying the yearly income. Fig 2 shows a typical frame after the user has entered all details and before the user presses *Enter*.
- 3) The program calculates the tax payable in that province and displays a letter to be sent to the user. The frame after the user presses *Enter* is shown in Fig 3.

Just to let you know the final frame after entering information about a person from Quebec is shown in Fig 4.

The image shows a graphical user interface window titled "Calculate Tax". The window has a standard Windows-style title bar with a minimize button, a maximize button, and a close button. Inside the window, there are four text input fields arranged vertically, each preceded by a label: "Enter Name", "Enter Address", "Enter Province", and "Enter Income". Below these fields is a large, empty rectangular area. At the bottom of the window, there are two radio buttons, one labeled "male" and one labeled "female".

Fig 1: Initial frame displayed by the system.

Calculate Tax

Enter Name John Smith

Enter Address 401 Sunset Ave, Windsor

Enter Province Ontario

Enter Income 40000.00

☒ male ☐ female

Fig 2: Frame after the user types all details and before pressing Enter.

Calculate Tax

Enter Name

Enter Address

Enter Province

Enter Income

November 23, 2011

401 Sunset Ave, Windsor
Ontario

Dear Mr John Smith,
Your tax is \$8000.0

Yours sincerely

☒ male ☐ female

Fig 3: Frame after the user presses Enter.

The image shows a window titled "Calculate Tax" with a standard Windows-style title bar (minimize, maximize, close buttons). The window contains a form with four input fields: "Enter Name", "Enter Address", "Enter Province", and "Enter Income". Below these fields, the date "23 novembre, 2011" is displayed. The address "486 Rue Quebec Montreal Quebec" is shown. The salutation "Chere Mme/Melle Eve Curie," is followed by the tax amount "Votre taxe est \$12500.0". Below this, the phrase "Sincerement votre" is followed by a large empty rectangular box. At the bottom of the window, there are two radio buttons: "male" (unselected) and "female" (selected).

Calculate Tax

Enter Name

Enter Address

Enter Province

Enter Income

23 novembre, 2011

486 Rue Quebec Montreal
Quebec

Chere Mme/Melle Eve Curie,
Votre taxe est \$12500.0

Sincerement votre

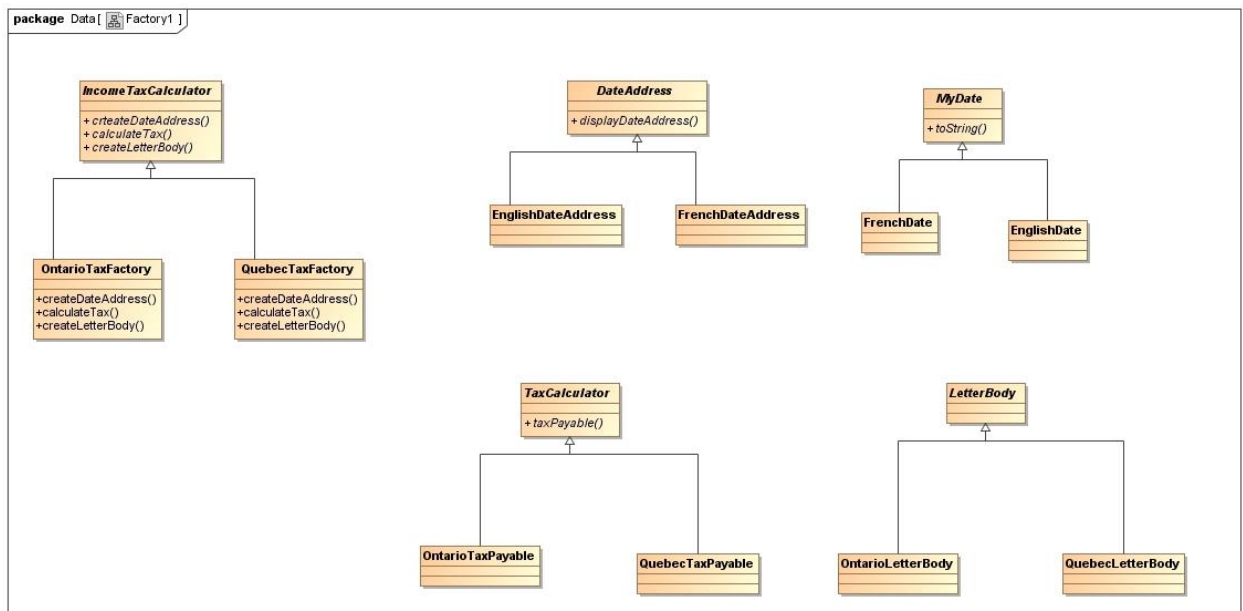
☐ male ☒ female

Fig 4: Appearance of frame for a female user from Quebec.

Work to be done:

Using the idea of Abstract factory, show how you can rewrite the application.

Hints: Consider the figure below



We will use this scheme in our solution.