

Time slot: 9:30 – 12:00 (150 minutes)

Important notes:

- You are allowed to use everything on paper (books, notes, etc.) and on your laptop, but only what you bring in: you are not allowed to borrow something from someone else.
- During the exam it is not allowed to use the network. You should make the exam yourself: so no communication with MSDN or google for help and no communication with other students, like using Facebook, e-mail, Skype, Dropbox, mobile phone or whatever.

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Piggy Banks

Introduction

Your friends want to save up cash for an awesome European road trip. To do so, they decide to use piggy banks. However, we all remember the days when you dropped coins in a piggy bank and then robbed it with a butter knife when you needed a little extra money.

No more smashing piggy banks! Your assignment for this exam is to create an app to manage digital piggy banks.

The app enables users to add/remove piggy banks, show piggy banks, deposit money to piggy banks, transfer money from one piggy bank to another, etc.

The user interface for this app has already been made (see Screenshot 1), and you can find it in the startup project.

More specific instructions will be provided in the assignments. In case you need to add more functionality, feel free to do so.

The user interface (Form1) looks like this:

The screenshot shows a Windows form titled 'Form1'. It has a pink background and a white border. The form contains the following elements:

- Name:** A text box containing 'Bert'.
- Display Area:** A large white rectangular area displaying a list of piggy banks and their balances:
 - Andre's piggy bank: 5.00
 - Michel's piggy bank: 5.00
 - Chung's piggy bank: 5.00
 - Kalina's piggy bank: 5.00
 - Georgiana's piggy bank: 5.00
 - Bert's piggy bank: 5.00
- Add/Remove:** A group box containing two buttons: 'Add' and 'Remove'.
- Show Info:** A group box containing a 'Limit' text box, a 'Show All' button, a 'Show At Least' button, and a 'Show Total' button.
- Deposit:** A group box containing an 'Amount' text box with the value '44', radio buttons for 'euro' (selected) and 'cents', and a 'Deposit' button.
- Transfer:** A group box containing a 'To Name' text box and a 'Transfer' button.

Screenshot 1

- In the “Add/Remove” groupbox, you can add or remove piggy banks.
- In the “Show Info” groupbox, there are buttons to show some information.
- In the “Deposit” groupbox, you can deposit money (either euros or cents) to a piggy bank.
- In the “Transfer” groupbox, you can transfer money from a piggy bank to another piggy bank.

Now it's time to open the startup project; it will be your task to implement the required functionality.

Assignment 1 (2 + 8 = 10 points)

Assignment 1a:

First of all, at the top of the window in Screenshot 1, you see in the title-bar the text "Form1", change this text to "The Piggy Bank App by <<your name>>". Of course <<your name>> should be your own name.

Assignment 1b:

Add some collection(s) to keep track of all the piggy bank owner names and corresponding balances.

Assignment 2: Adding/Removing Piggy Banks (8 + 12 = 20 points)

Assignment 2a:

Implement button btnAdd, that takes a given owner name from tbName and tries to add it to the collection.

- To encourage persons to start a digital piggy bank, new piggy bank owners are gifted 5 euro. Make sure that every new piggy bank starts with balance of 5 euro.
- Make sure that there cannot be two piggy banks with the same owner name.

If the adding was successful, update the listbox accordingly (see Screenshot 1). If not, show an appropriate message; for instance: "There already exists a piggy bank owner with this name". It is up to you where you show this information on the screen.

Assignment 2b:

Implement button btnRemove, that takes a given owner name from tbName and tries to remove it.

- Make sure that the piggy bank owner name as indicated in the tbName exists in the collection.
- To avoid losing money, piggy banks with some money cannot be removed. Make sure that you can only remove piggy banks with balance 0.

If the removing was successful, update the listbox accordingly. If not, show an appropriate message; for instance: "Piggy bank owner name not found" or "There are still some money in your piggy bank". It is up to you where you show this information on the screen.

Assignment 3: Show Info (10 + 10 + 10 = 30 points)

Assignment 3a:

Implement button btnShowAll that shows in the listbox all piggy banks (Screenshot 1).

Assignment 3b:

Implement button btnShowAtLeast that shows in the listbox all piggy banks with balance at least the limit given in the textbox tbLimit.

Assignment 3c:

Implement button btnShowTotal that must inform the user about how much money in total there is in all piggybanks together. It is up to you where you show this information on the screen. For instance, in Screenshot 1, the total balance of all piggy bank owners is 30 euro.

Assignment 4: Deposit (15 points)

Implement button `btnDeposit` that adds the given amount from the textbox `tbAmount` to the piggy bank with owner name indicated in textbox `tbName`.

The amount from the textbox `tbAmount` can be in euro or cents. The value is determined by the radiobuttons `rbEuro` and `rbCents`. For instance, see Screenshot 1. The value in `tbAmount` is 44:

- If `rbEuro` is selected, then the added amount is 44.00.
- If `rbCents` is selected, then the added amount is 0.44.

You may also assume that value in `tbAmount` is always an integer.

Update the listbox accordingly.

Assignment 5: Transfer (25 points)

Implement button `btnTransfer` that transfers all money from the piggy bank with owner name as indicated in `tbName` to the piggy bank with owner name as indicated in `tbTransferToName`.

- Make sure that the piggy bank owner names as indicated in the `tbName` and `tbTransferToName` exists in the collection.
- Make sure that you cannot transfer to your own piggy bank.

If there are indeed piggy banks with owner names as indicated in the textboxes, transfer all money from one piggy bank to the other and update the listbox. If not, show an appropriate message; for instance: "Piggy bank owner name not found" or "You cannot transfer to your own piggy bank". It is up to you where you show this information on the screen.

END of ADO exam.