Application Development Orienting

Assignments week 2

Quiz questions, practical assignments and

answers to quiz questions

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# Quiz

Difficulty: C:\Users\874156\Desktop\flatastic-icons-part-1-by-custom-icon-design\png\16x16\star-2_5.png. Estimated time: 40 minutes.

Answers to the quiz-questions can be found in the last section of this chapter.

## Question 1

What is the value of the variable **b** after running this piece of code:

int a, b;

a = 10\*2;

if ( a>15 )

{

b = a + 10;

}

else

{

b = a - 10;

}

## Question 2

What is the value of the variable **b** after running this piece of code:

int a, b;

a = 10\*2;

if ( a>20 )

{

b =a + 10;

}

else

{

b = a - 10;

}

## Question 3

What will be shown on the screen after running this piece of code:

int myCapital;

myCapital = 45-10;

int myBanksCapital;

myBanksCapital = 9646104;

if ( myCapital + myBanksCapital > 1000000)

{

MessageBox.Show(“Together we are rich!”);

}

else

{

MessageBox.Show(“Poor us ! ! !”);

}

## Question 4

What are the values of the variables **a** and **b** after running this piece of code:

int a = 20;

a = a + 10;

int b = 5;

if ( a < 43)

{

a = a + 5 ; b = b + 5*;*

}

a = a + 5;

if ( a < 43)

{

a = a + 5 ; b = b + 5*;*

}

a = a + 5;

if ( a < 43)

{

a = a + 5 ; b = b + 5*;*

}

## Question 5

What is the value of the variable **b** after running this piece of code:

int a = 20;

int b = 5;

if ( a + b < 25)

{

b = b + 5*;*

}

else

{

if ( 12 > a - b )

{

b = b + 100*;*

}

else

{

b = b + 20*;*

}

}

## Question 6

What will be shown on the screen after running this piece of code:

int myShoesize;

myShoesize = 45-1;

int myHeartbeat;

myHeartbeat = 96;

if ( myShoesize < 44 && myHeartbeat < 100)

{

MessageBox.Show(“yes”);

}

else

{

MessageBox.Show(“no”);

}

## Question 7

What will be shown on the screen after running this piece of code:

int myShoesize;

myShoesize = 45-1;

int myHeartbeat;

myHeartbeat = 96;

if ( myShoesize < 44 || myHeartbeat < 100)

{

MessageBox.Show(“yes”);

}

else

{

MessageBox.Show(“no”);

}

## Question 8

What is wrong in the following piece of code (line numbers do not belong to the code, but are added to easily identify the lines with errors):

1 int myShoesize;

2 myShoesize = 39;

3

4 if ( 35 < myShoesize < 44 )

5 { MessageBox.Show(“average feet”); }

6 else

7 {

8 MessageBox.Show(“big or small feet”);

9 }

## Question 9

What should be changed in the code from the previous question (i.e. question 8) if the idea was:

* *if the shoe size is more than 35 and less than 44, show the text “average feet”; otherwise show the text “big or small feet”*

## Question 10

Which texts will be shown by running this piece of code and what is the value of the variable **a** after running this piece of code:

int a = 0;

if ( a < 7)

{ a = a + 1; MessageBox.Show(“hello” + a)*;* }

a = a + 2;

if ( a < 7)

{ a = a + 1; MessageBox.Show(“hello” + a)*;* }

a = a + 2;

if ( a < 7)

{ a = a + 1; MessageBox.Show(“hello” + a)*;* }

a = a + 2;

if ( a < 7)

{ a = a + 1; MessageBox.Show(“hello” + a)*;* }

a = a + 2;

if ( a < 7)

{ a = a + 1; MessageBox.Show(“hello” + a)*;* }

a = a + 2;

# Practical assignments

## Programming Assignment 1: Toggle colors

Difficulty: C:\Users\874156\Desktop\flatastic-icons-part-1-by-custom-icon-design\png\16x16\star-2_5.png. Estimated time: 20 minutes.

The assignment covers the following learning goals:

* Implementing a simple if-statement.

### Case description

Create a new application that has one button on the form. When clicking this button, the application should toggle between 2 colors, for example purple and green (feel free to choose any colors).

### User interaction

If the background-color of the window is purple, then clicking the button results in a green background. Similarly, if the background-color of the window is green, then clicking the button results in a purple background.

When starting your application, the background-color is most probably grey. Now, if you click the button for the first time, what color will it get: purple or green? And if you click a second time?

## Programming Assignment 2: Toggle colors extended

Difficulty: C:\Users\874156\Desktop\flatastic-icons-part-1-by-custom-icon-design\png\16x16\star-2_5.png. Estimated time: 20 minutes.

The assignment covers the following learning goals:

* Implementing nested if-statements.

### Case description

This assignment builds on top of the previous assignment. Now, we would like to toggle between 3 colors, the two colors you had in the former assignment and a third color.

### User interaction

Clicking the button should set the background-color of the window to the next background-color. In case the background-color was the last color, it should be set to your first color.

Additionally, if at the start-up of your application, the background-color is still grey, change the solution in such a way that also at start-up, the background-color is one of your three chosen colors.

## Programming Assignment 3: BMI calculator

Difficulty: C:\Users\874156\Desktop\flatastic-icons-part-1-by-custom-icon-design\png\16x16\star-3_5.png. Estimated time: 40 minutes.

The assignment covers the following learning goals:

* Practice with if-statements and operators

### Case description

The Body Mass Index (BMI) indicates whether you are too skinny, have normal weight or are overweight. The BMI is calculated as follows:

BMI = weight / ( height2), where weight is in kilograms and height is in meters.

The following table indicates what the value of the BMI stands for:

|  |  |
| --- | --- |
| **Body mass index** | **explanation** |
| bmi < 18,5 | underweight |
| 18,5 <= bmi < 25,0 | normal weight |
| 25,0 <= bmi < 30,0 | overweight |
| bmi >= 30,0 | obese |

### User interaction

The user should be able to input a weight and a height (e.g. in some textboxes, each having a nice name). The user should then be able to click a button, which results in calculating the BMI, displaying it somewhere on the window and also inform the user about underweight, normal, overweight, or obese. For example, in case of obese, show the text “Your BMI is extremely high. Please contact your doctor, because your health is in danger!”.

### Screenshots

### Additional features

By coding: this.lblExplanation.Text = "your bmi is: " + bmi.ToString();

you get a lot of decimals as in the above screenshot, because the BMI is converted to a string in the default way.

There are other ways of converting. One of them is that you want to have a fixed number of decimals. In that case, you have to hand the pattern "0.00" to the ToString()-method.

The code this.lblExplanation.Text = "your bmi is: " + bmi.ToString("0.00");

converts the BMI to a string, rounded to 2 decimals.

## Programming Assignment 4: Calculator extended

Difficulty: C:\Users\874156\Desktop\flatastic-icons-part-1-by-custom-icon-design\png\16x16\star-2_5.png. Estimated time: 20 minutes.

The assignment covers the following learning goals:

* Validate the input with if-statements.

### Case description

Open the calculator-solution from last week. In that assignment, we did not pay attention to the fact that the user might accidently try to divide by zero. If so, your app will crash. You are lucky that the app runs in Visual Studio, so Visual Studio does not let your system really crash, but helps you in finding the error. In case you run the app outside Visual Studio, the app would crash.

Prevent it from crashing in case the user tries to divide by 0. If that happened, inform the user by showing an adequate message on the screen.

### Additional features

Now that we validated the input for 0, it would be nice to also check that the user inputted some numbers. How would you validate that the textboxes contain some information?

## Programming Assignment 5: Truck management extended

Difficulty: C:\Users\874156\Desktop\flatastic-icons-part-1-by-custom-icon-design\png\16x16\star-4_5.png. Estimated time: 90 minutes.

The assignment covers the following learning goals:

* Combine if-statements and operators.

### Case description

Last week, you developed an application to calculate how many containers fit on a truck. Now, we want to extend the app to calculate the cost of transporting an order.

Different transport companies have different trucks with different capacity. Additionally, the number of boxes that fit on a pallet might differ per company. In the following table you see some numbers for transport companies A, B and C.

|  |  |  |  |
| --- | --- | --- | --- |
| **Transport company** | A | B | C |
| **Pallets per truck** | 20 | 24 | 28 |
| **Boxes per pallet** | 30 | 30 | 35 |
| **Truck price** | 400,00 euro | 430,00 euro | 500,00 euro |
| **Pallet price** | 25,00 euro | 19,00 euro | 34,00 euro |
| **Box price** | 1,50 euro | 1,25 euro | 2,50 euro |

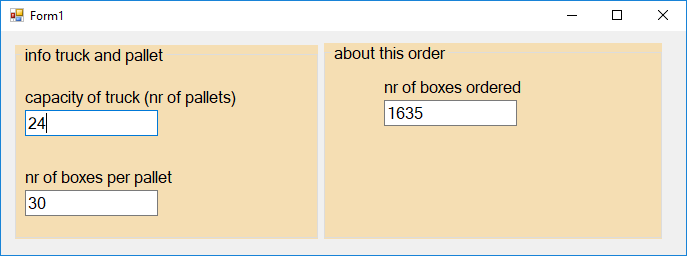
Explanation: suppose we use transport company B. Their trucks fit 24 pallets, and each pallet fits 30 boxes. If we order 1635 boxes, we need 2 complete trucks, 6 pallets and 15 boxes (you calculated that already last week). The total price to transport the order is 2 \* 430,00 euro + 6 \* 19,00 euro + 15 \* 1,25 euro = 992,75 euro.

### User interaction

The user should be able to select one of the 3 companies: A, B, and C. This can be done with radiobuttons. Choosing one of the options should result in showing the right pallets per truck and the right boxes per pallet on the screen.

The user should then be able to click a button that should calculate the total price to transport the order by the selected transport company and show the total price on the screen.

### Screenshots

The application looked like below (although you added more controls to it). Extend it to include the 3 options and the extra button.

# Quiz answers

|  |  |
| --- | --- |
| Question | Answer |
| 1 | 30 |
| 2 | 10 |
| 3 | Together we are rich! |
| 4 | 50 15 |
| 5 | 25 |
| 6 | no |
| 7 | yes |
| 8 | Line 5 (the second “<” compares a boolean with an integer) |
| 9 | 35 < myShoesize && myShoesize < 44 |
| 10 | The texts “hello1”, “hello4” and “hello7”  Variable a has value 13 |