SECTION C

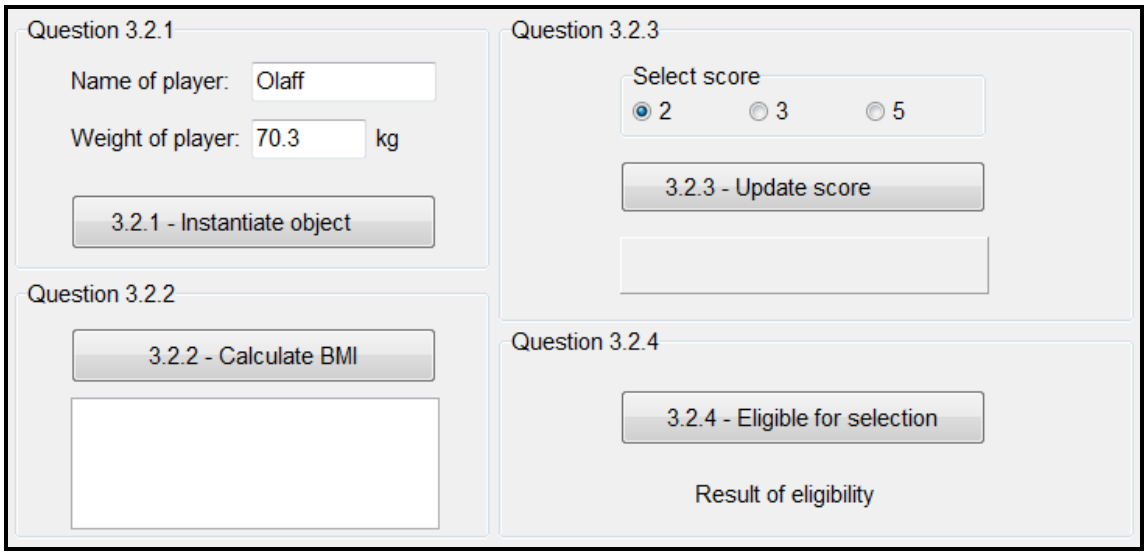
QUESTION 3: OBJECT-ORIENTATED PROGRAMMING

The school is designing software to calculate the body mass index (BMI) of the rugby players and to determine the eligibility of the rugby players for selection.

Do the following:

- Open the incomplete program in the **Question 3** folder.
- Open the incomplete object class **Player_U.pas**.
- Enter your examination number as a comment in the first line of both the **Question3_U.pas** file and the **Player_U.pas** file.
- Compile and execute the program. The program has no functionality currently.

Example of the GUI:



- Complete the code as specified in QUESTION 3.1 for the **Player_U** object class and QUESTION 3.2 for the **Question3_U** form class.

3.1 The incomplete object class (**TPlayer**) provided contains the declarations of three attributes that define a **Player** object.

The attributes for the **Player** object have been declared as follows:

Names of attributes	Description
fPlayerName	The first name of the rugby player
fWeightOfPlayer	The weight of the player
fScore	The score achieved at a specific rugby game

3.1.1 Write code for a **constructor** method that will receive the player's name and weight as parameter values. Assign these values to the respective attributes. Set the score attribute to the value of zero. (4)

3.1.2 Write code for an accessor method called **getScore** for the **fScore** attribute. (2)

3.1.3 Write code for a method called **updateScore** that will receive an integer value as a parameter and add the received value to the **fScore** attribute. (3)

3.1.4 Write code for a method called **calculateBMI** that must receive the height of the player as a parameter and calculate and return the player's BMI based on the following formula:

BMI = weight of player/(height of player)^2 (3)

3.1.5 Write code for a method called **eligibleForSelection** that can be used to determine the possibility for selection to play at the Provincial Trials Tournament. Possible selection is determined by evaluating the content of **fScore** attribute according to the following categories:

Score	Message
0 to 7 points	Low possibility
8 to 14 points	Medium possibility
More than 14 points	High possibility

The method must return the relevant message. (4)

3.1.6 Write code for a **toString** method to display the attributes of the player object in the following format:

```
Name: <fPlayerName>
Weight: <fWeightOfPlayer>
Current score: <fScore>
```

Example:

```
Name: Olaff
Weight: 70.3
Current score: 0
```

(4)

3.2 An incomplete unit **Question3_U** has been provided and contains code for the object class to be accessible.

The following global variable has been declared:

The object **objPlayer**

Do the following to complete the code for QUESTION 3.2.1 to QUESTION 3.2.4 in the main form unit:

3.2.1 **Button [3.2.1 - Instantiate object]**

Write code to do the following:

- Use the name and weight of the player from the edit boxes provided to instantiate a Player object.
- Display a message, using a dialog box, to indicate that the object has been instantiated. (5)

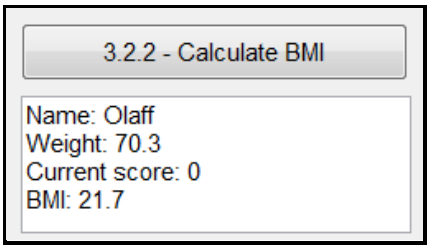
3.2.2 **Button [3.2.2 - Calculate BMI]**

The **redQ3_2_2** component must be used as the display area.

Write code to do the following:

- Use an input dialog box to enter the height of the player.
- Call the relevant method using the height as an argument to calculate the BMI of the player.
- Call the **toString** method to display the information of the player object.
- Display the BMI of the player, rounded off to ONE decimal place.

Example of output if the weight of the player is 70,3 kg and the height of the player is 1,80 m:



(7)

3.2.3 **Button [3.2.3 - Update score]**

The score of a player is updated as the game progresses.

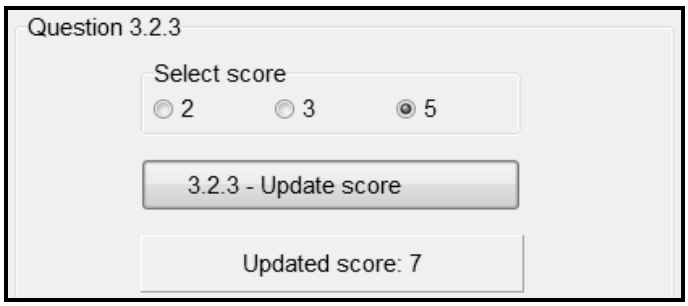
The user must select a score in the radio group called **rgpQ3_2_3** and click the **Update score** button each time the player scores points during the game.

Write code to do the following:

- Extract the score that was selected from the component **rgpQ3_2_3**.
- Call the correct method to update the score attribute.
- Call the correct method to return the score.
- Display the updated score of the player in the **pnlQ3_2_3** component.

Example of output if the value of 2 was selected as the first score and the **Update score** button was clicked:

Example of output if the value of 5 was selected as the next score and the **Update score** button was clicked:

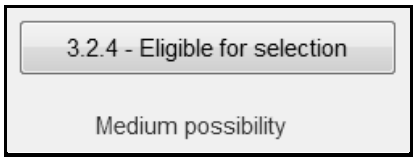


(6)

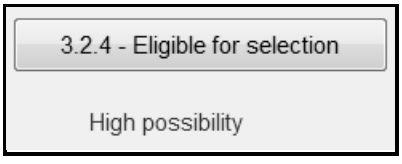
3.2.4 **Button [3.2.4 - Eligible for selection]**

Write code to call the method that returns a message indicating the player's eligibility for selection. Display the message in the label **lblQ3_2_4**.

Example of output if the current score of the player is 8:



Example of output if the current score of the player is 15:



(2)

- Ensure that your examination number has been entered as a comment in the first line of the object class and the form class.
- Save all files.
- Print the code if required.

TOTAL SECTION C: 40