Criterion C: Development

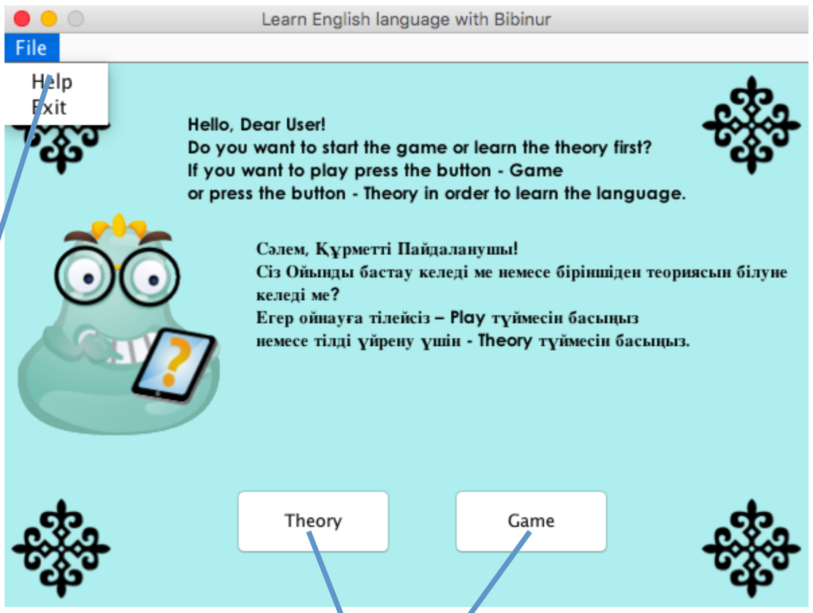
The techniques used in the application include:

- Graphical User Interface
- Global and local variables
- Inheritance
- Audio

Graphical user interface

The design of the program is the essential part because it will take the attention of the client and encourages her to continue to use it. The graphical user interface follows the requirements of the client. For instance, Tifanny's color, readable font, graphs, pictures and other tools were used.

Main window



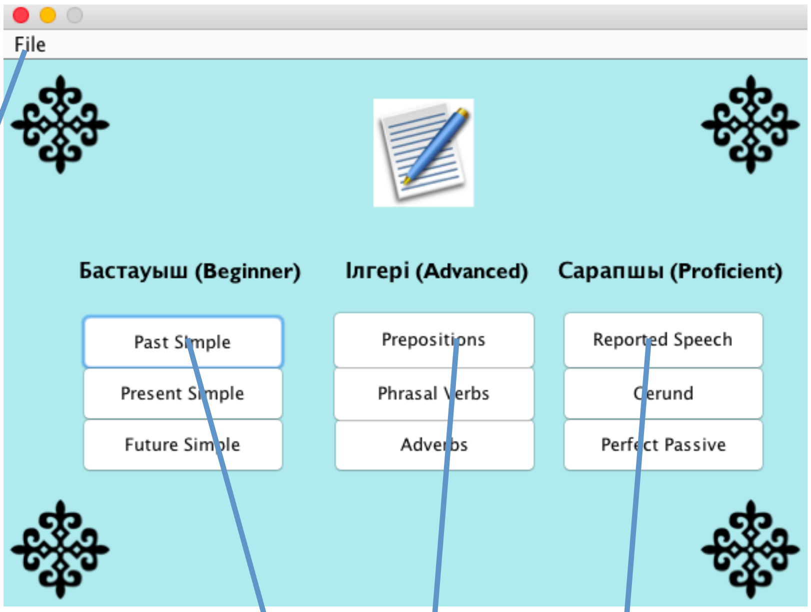
Hello, Dear User!
Do you want to start the game or learn the theory first?
If you want to play press the button - Game
or press the button - Theory in order to learn the language.

Сәлем, Құрметті Пайдаланушы!
Сіз Ойынды бастау келеді ме немесе біріншіден теориясын білуне келеді ме?
Егер ойнауға тілейсіз – Play түймесін басыңыз
немесе тілді үйрену үшін - Theory түймесін басыңыз.

The buttons open new screen: theory and game pages. The font is big, therefore allows the user read

The menu bar consists of help file that shortly explains the purpose of the application and how does it work. The function exit closes the window.

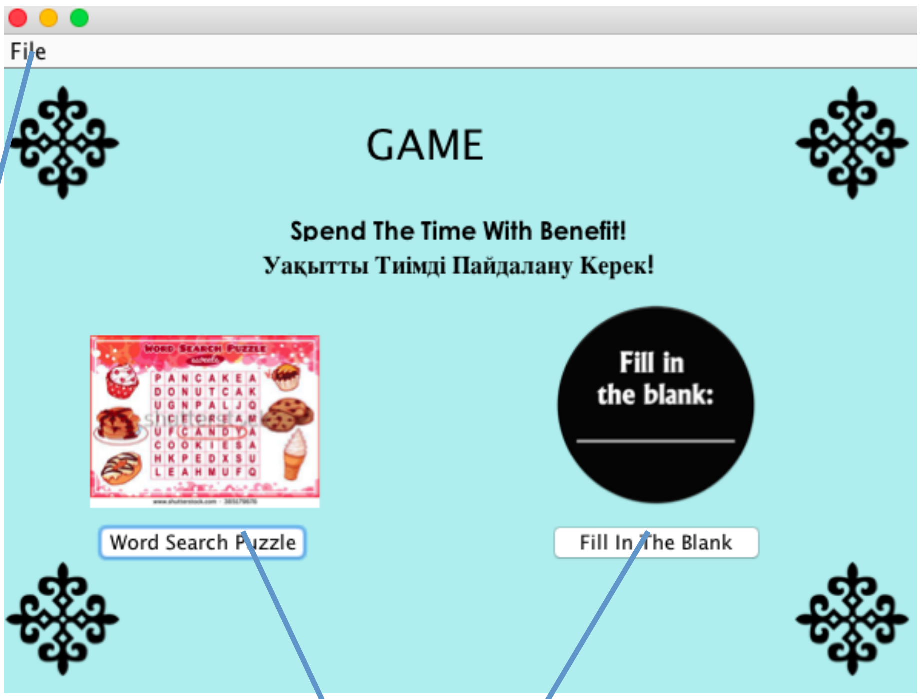
Theory page



The buttons open new window that contains the information of some English grammar rules and so on. The font is big, therefore allows the user

The menu bar allows the client to exit the program, to open the Help file and to go to the Game Page after she finished the course.

Game page



The menu bar allows the client to exit the program, open the Help File and to go to the Theory Page in order to revise some material.

The buttons open new window that contains the different types of games. The font is big, therefore allows the user read without any problem

This is the method that creates the interface of the program. All the other pages follow it: Tiffany's color; the font size is 13; the Kazakh ornament's pictures at the angles and menu bar can be met in the main page, help file, theory page and game page

```
private void initialize() {
			frame = new JFrame("Learn English language with Bibinur");
		frame.getContentPane().setBackground(new Color(175, 238, 238));
		frame.setBounds(100, 100, 600, 450);
		frame.setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);
		frame.setResizable(false);
		frame.getContentPane().setLayout(null);

		JLabel lblNewLabel_1 = new JLabel("");
		lblNewLabel_1.setBounds(6, 6, 98, 80);
		Image img = new
ImageIcon(this.getClass().getResource("/pp.png")).getImage();
		lblNewLabel_1.setIcon(new ImageIcon(img));
		frame.getContentPane().add(lblNewLabel_1);

		JLabel label = new JLabel("");
		label.setBounds(6, 315, 98, 90);
		Image img1 = new
ImageIcon(this.getClass().getResource("/pp.png")).getImage();
		label.setIcon(new ImageIcon(img1));
		frame.getContentPane().add(label);

		JLabel label_1 = new JLabel("");
		label_1.setBounds(519, 6, 81, 80);
```

```
                Image img2 = new
ImageIcon(this.getClass().getResource("/pp.png")).getImage();
                label_1.setIcon(new ImageIcon(img2));
                frame.getContentPane().add(label_1);

                JLabel label_2 = new JLabel("");
                label_2.setBounds(519, 315, 75, 90);
                Image img3 = new
ImageIcon(this.getClass().getResource("/pp.png")).getImage();
                label_2.setIcon(new ImageIcon(img3));
                frame.getContentPane().add(label_2);

                JLabel lblNewLabel_2 = new JLabel("");
                lblNewLabel_2.setBounds(6, 105, 181, 180);
                Image img4 = new
ImageIcon(this.getClass().getResource("/individual.png")).getImage();
                lblNewLabel_2.setIcon(new ImageIcon(img4));
                frame.getContentPane().add(lblNewLabel_2);

                JMenuBar menuBar = new JMenuBar();
                frame.setJMenuBar(menuBar);

                JMenu mnNewMenu = new JMenu("File");
                menuBar.add(mnNewMenu);

                JMenuItem mntmNewMenuItem = new JMenuItem("Exit");
                mntmNewMenuItem.addActionListener(new ActionListener() {
                        public void actionPerformed(ActionEvent e) {
                                System.exit(JFrame.EXIT_ON_CLOSE);
```

```
				}
			});


			JMenuItem mntmHelp = new JMenuItem("Help");
			mntmHelp.addActionListener(new ActionListener() {
				public void actionPerformed(ActionEvent e) {
					helpFile help=new helpFile();
					help.help();
				}
			});
			mnNewMenu.add(mntmHelp);
			mnNewMenu.add(mntmNewMenuItem);
		}
	}
```

Variables

I used local variables in the classes and methods to keep track of different variables and to use them in the application. For instance, to calculate the score of the “Fill In The Blank” game, the variable scores was used. Moreover, I used a lot of labels and buttons.

```
int scores= 0;
            int ind=comboBox_1.getSelectedIndex();
            if(ind==0)
            {
                  scores=scores+1;
                  System.out.println("Scores"+scores);
            }
            else {
            }
            JButton btnNewButton_1 = new JButton("Theory");
            btnNewButton_1.setBackground(Color.CYAN);
            btnNewButton_1.addActionListener(new ActionListener() {
                  public void actionPerformed(ActionEvent e) {
                                    theoryPage theory=new theoryPage();
                                    theory.setVisible(true);
                  }
            });
            btnNewButton_1.setBounds(172, 315, 117, 51);
            frame.getContentPane().add(btnNewButton_1);
```

Inheritance

"Extends Thread" means inheriting all the functions of the Thread class. It is vey useful because less time and resource are needed to create a thread. Threads share their parent process data and code and the intercommunication is easies that process communication.

```
private class PlayThread extends Thread
        {
           byte tempBuffer[]  = new byte[10000];

           public void run()
           {
              try
              {
                 sourceDataLine.open(audioFormat);
                 sourceDataLine.start();

                 int cnt;

                 while((cnt = audioInputStream.read(
                       tempBuffer, 0, tempBuffer.length)) != 1
                          && stopPlayback == false)
                 {
                    if(cnt >0)
                    {
                       sourceDataLine.write(tempBuffer, 0, cnt);
                    }
                 }
```

```
    sourceDataLine.drain();
    sourceDataLine.close();


    stopBtn.setEnabled(false);
    playBtn.setEnabled(true);
    stopPlayback = false;
}


catch (Exception e)
{
    e.printStackTrace();
    System.exit(0);
        }
    }
}
```

Audio

The audio was used in order in order to help the user with pronunciation. If the user presses button “Play”, the audio starts. If the button “Stop” is pressed, the audio is stopped. The audio will always begin from the start.

```
private void playAudio()
        {
           try
           {
              File soundFile = new File("/Users/bibinur/Downloads/Dialog1.wav");
              audioInputStream = AudioSystem.getAudioInputStream(soundFile);
              audioFormat = audioInputStream.getFormat();
              System.out.println(audioFormat);
              DataLine.Info dataLineInfo = new DataLine.Info(SourceDataLine.class,
audioFormat);
              sourceDataLine = (SourceDataLine)AudioSystem.getLine(dataLineInfo);
              new PlayThread().start();
           }

           catch(Exception e)
           {
              e.printStackTrace();
              System.exit(0);
           }
        }

        private class PlayThread extends Thread
        {
           byte tempBuffer[]  = new byte[10000];
```

```
public void run()
{
    try
    {
        sourceDataLine.open(audioFormat);
        sourceDataLine.start();

        int cnt;

        while((cnt = audioInputStream.read(
                tempBuffer, 0, tempBuffer.length)) != 1
                    && stopPlayback == false)
        {
            if(cnt >0)
            {
                sourceDataLine.write(tempBuffer, 0, cnt);
            }
        }

        sourceDataLine.drain();
        sourceDataLine.close();

        stopBtn.setEnabled(false);
        playBtn.setEnabled(true);
        stopPlayback = false;
    }

    catch (Exception e)
{
    e.printStackTrace();
    System.exit(0);
        }
    }
}
```