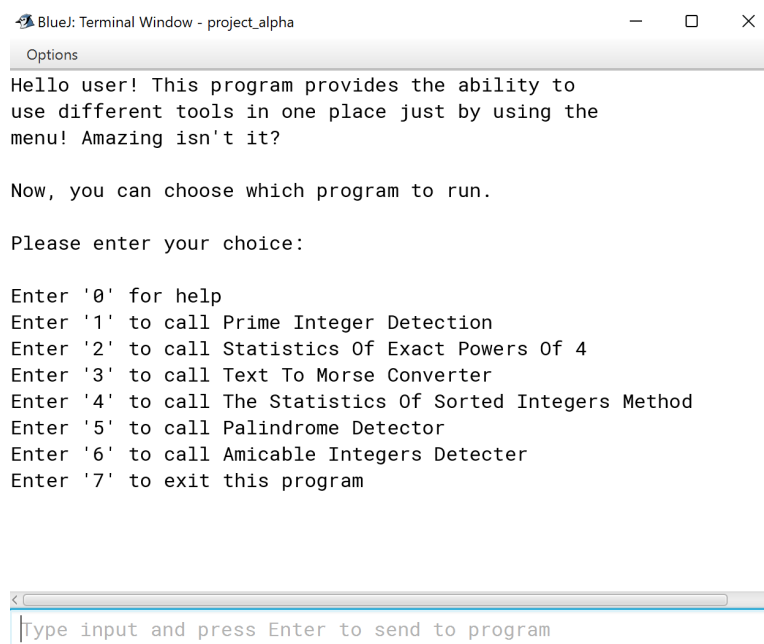# Course Project Report

Introduction

Our task was to develop a program containing the 7-option menu that runs until the user decides to exit and enter the 7th option. This menu should give the user the opportunity to use 6 different utilities. For each user input, the program must check the correctness of the entered data. If the user entered something incorrectly, the program should warn about this and ask the user to enter the data again. The code should be well commented and clearly organized, give clear instructions to the user throughout the work and do not waste time or memory using.

Description

As was mentioned before, the whole program is a while loop that keeps the menu working. Inside this loop is the switch case method, which runs different parts of the code for different utilities, depending on the menu item selected by the user. At the start of a program, the user can see the greeting and the menu with the valuable options.

```
🐦 BlueJ: Terminal Window - project_alpha          —    □    ×
 Options
Hello user! This program provides the ability to
use different tools in one place just by using the
menu! Amazing isn't it?

Now, you can choose which program to run.

Please enter your choice:

Enter '0' for help
Enter '1' to call Prime Integer Detection
Enter '2' to call Statistics Of Exact Powers Of 4
Enter '3' to call Text To Morse Converter
Enter '4' to call The Statistics Of Sorted Integers Method
Enter '5' to call Palindrome Detector
Enter '6' to call Amicable Integers Detecter
Enter '7' to exit this program



<                                                          >
 Type input and press Enter to send to program
```

Picture 1 - Start of the program and main menu

After the input of the menu item, the program calls the corresponding code snippet that releases the selected utility. After all of the work is done, the program waits for the user to press any key and then returns to the main menu and asks the user for another selection.

The top-level flowchart for the whole program is presented below:

```
                          START

                    DISPLAY menu

                  Please enter your choice:

                     Enter '0' for help
                   Enter '1' to call Prime
                      Integer Detection
                  Enter '2' to call Statistics
                    Of Exact Powers Of 4
                   Enter '3' to call Text To
                       Morse Converter
                  Enter '4' to call The
                  Statistics Of Sorted
                    Integers Method
                    Enter '5' to call
                  Palindrome Detector
                 Enter '6' to call Amicable
                     Integers Detecter
                  Enter '7' to exit this
                        program

                         READ
                       menu_item


     Input is
     integer?          ── False ──


       True

    Choice = 0  ──→  function0()            Choice = 4  ──→  function4()

       False                                  False

    Choice = 1  ──→  function1()            Choice = 5  ──→  function5()

       False                                  False

    Choice = 2  ──→  function2()            Choice = 6  ──→  function6()

       False                                  False

    Choice = 3  ──→  function3()            Choice = 7  ── False →  DISPLAY
                                                                     Wrong
              ── False ──                      True                  input

                                             DISPLAY
                                             Bye Bye

                                               END
```
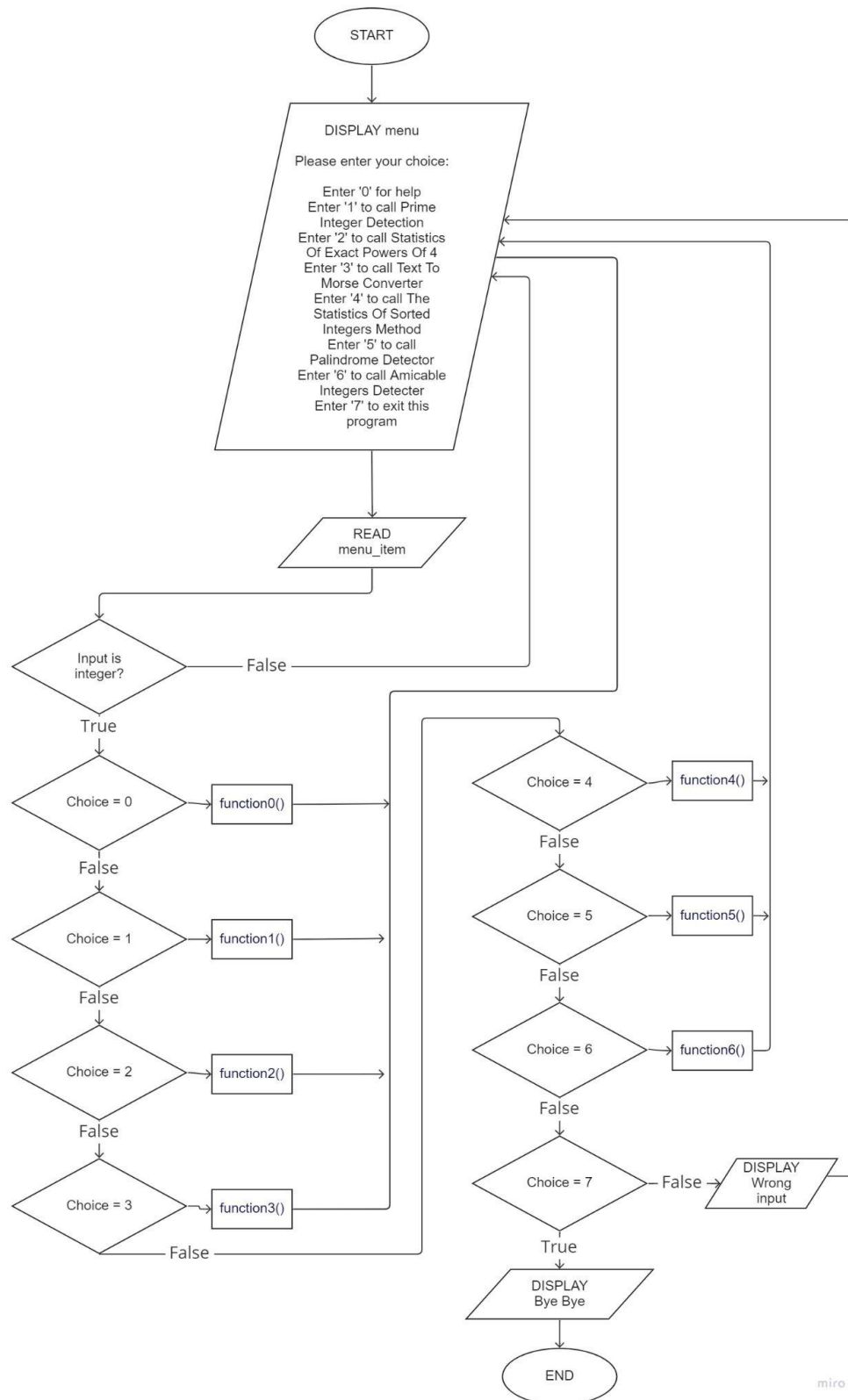
Picture 2 - Flowchart

If the user enters "0", the whole description of each utility will appear.

```
You have selected description option!

DESCRIPTION
---------------------------------
1 - Prime Integer Detector
Displays all prime numbers between 0 and 100, their population
count, sum and average.

2 - Statistics of exact powers of 4
Calculates and displays the list of all integer numbers between
0 and 25000 which are the exact 4th power of another integer.

3 - Text to Morse Converter
This program converts English text to Morse code and vice versa.

4 - Statistics of sorted integers
This program sorts the array in ascending order and provides
statistics such as min and max values, sum and average.

5 - Palindrome detector
Checks if the given string is a palindrome or not.

6 - Amicable Integers Detecter
Searches and identifies all the pairs of amicable integer numbers
between 0 and 3000.
---------------------------------

Press Enter to continue

Type input and press Enter to send to program
```

Picture 3 - Result of the description function

If the user decides to exit and inputs "7", the program will say goodbye to the user and stop working.

```
You decided to exit(

Thank you for using Project_Alpha!

We hope you were satisfied with our work!

See you soon!
(ﾉ◕ヮ◕)ﾉ*:･ﾟ✧

Can only enter input while your program i
```

Picture 4 - Exiting the program

Conclusion

After the work I have done, I can say that the whole project was not the easiest task. I think the most difficult part for me was the utility for translating text into Morse code and vice versa. It was on this part of the task that I spent the most time making the whole code work without errors, regardless of the input data. This part was also the most informative, since before this project I did not work much with strings and I had to learn about the work of many additional functions.

I consider the work on the palindrome detection utility to be the most positive part of the work. It was working as soon as I first did it and almost did not require additional studies.

References

1) Eckel, B. (2006) *Thinking in java 4th edition*. Pearson. Available at: http://www.dblab.ntua.gr/~gtsat/collection/Java%20books/Bruce.Eckel.Thinking.In.Java.4th.Edition.Dec.2007.eBook-BBL.pdf. (Accessed: December 1, 2022).
2) Sam, S. (2019) *Swap two variables in one line in using Java*, *Tutorials Point*. Available at: https://www.tutorialspoint.com/swap-two-variables-in-one-line-in-using-java#:~:text=Two%20variables%20can%20be%20swapped,y%20are%20the%202%20variables. (Accessed: November 29, 2022).
3) Oracle (1994) *The switch statement*, *The switch Statement (The Java™ Tutorials > Learning the Java Language > Language Basics)*. Available at: https://docs.oracle.com/javase/tutorial/java/nutsandbolts/switch.html (Accessed: December 2, 2022).
4) rohit2sahu (2021) *Java program to convert English text to Morse code and vice-versa*, *GeeksforGeeks*. Available at: https://www.geeksforgeeks.org/java-program-to-convert-english-text-to-morse-code-and-vice-versa/ (Accessed: November 28, 2022).
5) chandrakanth Bchandrakanth B 33911 gold badge22 silver badges99 bronze badges *et al.* (2016) *How to take input as string with spaces in Java using scanner*, *Stack Overflow*. Available at: https://stackoverflow.com/questions/39514730/how-to-take-input-as-string-with-spaces-in-java-using-scanner (Accessed: December 3, 2022).
6) GeeksforGeeks (2022) *Pairs of amicable numbers*, *GeeksforGeeks*. Available at: https://www.geeksforgeeks.org/pairs-amicable-numbers/ (Accessed: December 1, 2022).