

APPENDIX FIGURES

Appendix 1. Survey and Assessment Form

Students' Knowledge in Programming

This is a survey regarding the knowledge of students in the field of technology regarding programming.

*** Required**

Email address *

Your email

Full Name *

Your answer

School/University *

Your answer

Course *

Your answer

Grade/Year Level *

Your answer

What field in technology do you desire to work in? *

- ☐ Game Development
- ☐ Website Development
- ☐ Database Administrator
- ☐ Software Engineer
- ☐ Other: _____

Do you know how to program before you entered college level? *

- ☐ Yes
- ☐ No

Did you know that the course you've taken has programming subjects? *

- ☐ Yes
- ☐ No

How many years have you been programming? *

Your answer _____

What are the programming languages you are comfortable with? *

- ☐ C/C++
- ☐ Java
- ☐ C#
- ☐ Python
- ☐ Javascript
- ☐ Lua
- ☐ Other: _____

In what method of education do you learn the best/most? *

- ☐ Classroom setting
- ☐ Watching video tutorials
- ☐ Reading tutorials
- ☐ Modifying someone else's code
- ☐ One-on-one sessions
- ☐ Other: _____

What do you find hard to learn about programming? *

- ☐ Concepts
- ☐ Syntax
- ☐ Terminologies
- ☐ Code editor/Integrated Development Environment (IDE)
- ☐ Data structures
- ☐ Algorithm
- ☐ Data types
- ☐ Conditionals
- ☐ Other: _____

Which alternative method do you prefer to use in learning programming? *



- ☐ Visual Interactive Environment
- ☐ Other: _____



- ☐ Block-based programming

Rate your knowledge about Data Types *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Rate your knowledge about Memory *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Rate your knowledge about Debugging *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Rate your knowledge about Algorithm *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Basic Quiz

To fully evaluate your knowledge about programming, please answer the following if you can.

Rate your knowledge about Data Types *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Rate your knowledge about Memory *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Rate your knowledge about Debugging *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Rate your knowledge about Algorithm *

| | | | | | | |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | |
| lowest | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | highest |

Basic Quiz

To fully evaluate your knowledge about programming, please answer the following if you can.

Please choose the correct data type for the following value *

5 points

| | Double or Float | Integer | Character | String | Boolean |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 10.0f | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 'c' | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| "Hello World" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| true | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Consider the code below

```
int a = 10;  
int b = 20;
```

evaluate: (a < b) *

1 point

- ☐ true
- ☐ false

evaluate: (a != b) *

1 point

- ☐ true
- ☐ false

evaluate: $!(a < b)$ *

1 point

- ☐ true
- ☐ false
-

evaluate: $(a == (b - 10))$ *

1 point

- ☐ true
- ☐ false
-

Consider the code below:

```
1 int a = 20;  
2 int *b = &a;  
3 (*b)++;
```

What is the value of b in line number 2? *

1 point

- ☐ 20
- ☐ 21
- ☐ a
-

What is the value of b in line number 3? *

1 point

- ☐ 20
- ☐ 21
- ☐ 22

What is the final value of a? *

1 point

- ☐ 20
- ☐ 21
- ☐ 22
- ☐ b

Consider the code below:

```
int c[] = {1, 2, 3, 4, 5};
```

What is the value of c[1]? *

1 point

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 0

What is the value of c[5]? *

- ☐ 5
- ☐ Out of bounds
- ☐ 6
- ☐ 0

Consider the code below:

```
int a = 5;  
int b = 7;
```

```
if (a < b)  
    a -= b;  
else  
    b += a;
```

```
a++;  
b++;
```

What is the final value of a? *

1 point

☐ 0

☐ -2

☐ -1

☐ 1

☐ 2

What is the final value of b? *

1 point

☐ 8

☐ 7

☐ 6

☐ 9

Consider the code below:

```
int a = 5;  
int b = 20;
```

```
for (int i = a; i < b; i += 2)  
{  
    a++;  
    b--;  
}
```

What is the final value of a? *

1 point

Your answer

What is the final value of b? *

1 point

Your answer

Laboratory Assessment

Do you have different instructors/teachers for laboratory and lecture? *

- ☐ Yes
- ☐ No

What software do you use for programming during your laboratory subject? *

- ☐ TurboC\C++
- ☐ DevC++
- ☐ Netbeans
- ☐ Eclipse
- ☐ VS Code
- ☐ Codeblocks
- ☐ Notepad
- ☐ Other: _____

Do you find the softwares used in your laboratory for programming difficult to use? *

- ☐ Yes
- ☐ No

What are the things you find difficult in using softwares in your laboratory for programming? *

- ☐ Hard to compile, build, and run
- ☐ Messy/Cluttered interface - too many elements are in the screen
- ☐ Error/warning messages are unhelpful/complicated
- ☐ Old/Outdated design
- ☐ Other: _____

CodeNect: Visual Programming Software for Learning Fundamentals of Programming Survey Form

This is survey is for gathering of data for the development of a visual programming software for learning programming fundamentals.

This is a form about using text-based editors in programming. Examples are:

- * Notepad++
- * TurboC/C++
- * Sublime Text
- * DevC++
- * Visual Code
- * Codeblocks

* Required

Email address *

Your email

Full Name *

Your answer

School Name *

Your answer

Course *

- ☐ Bachelor of Science in Information Technology
- ☐ Bachelor of Science in Computer Science
- ☐ Bachelor of Science in Computer Engineering
- ☐ Other: _____

Grade/Year Level *

- ☐ 1st year
- ☐ 2nd year
- ☐ 3rd year
- ☐ 4th year
- ☐ Grade 11
- ☐ Grade 12

What text-based editing tool do you use for programming? *

- ☐ CodeBlocks
- ☐ Sublime Text
- ☐ Notepad++
- ☐ Visual Code
- ☐ DevC++
- ☐ TurboC/C++
- ☐ Other: _____

How did you learn how to use a text-based editor? *

- ☐ Instructor's demo
- ☐ Written lesson/lecture
- ☐ Self-learned
- ☐ Video tutorial
- ☐ Official documentation
- ☐ Experimentation/Playing around
- ☐ Other: _____

Rate your learning experience with using a text-based editor *

| | | | | | | |
|-------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------|
| | 1 | 2 | 3 | 4 | 5 | |
| worst | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | best |

How much do you prefer to use text-based editors for programming? *

| | | | | | | |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------|
| | 1 | 2 | 3 | 4 | 5 | |
| not preferred | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | preferred |

Rate the design/appearance of the text-based editors you use *

| | | | | | | |
|-------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------|
| | 1 | 2 | 3 | 4 | 5 | |
| worst | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | best |

Rate the debugging experience with using text-based editors. *

| | 1 | 2 | 3 | 4 | 5 | |
|-------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------|
| worst | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | best |

Rate the coding experience with using text-based editors. *

| | 1 | 2 | 3 | 4 | 5 | |
|-------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------|
| worst | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | best |

How likely do you use the tools/features available in the text-based editors? *

| | 1 | 2 | 3 | 4 | 5 | |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------|
| not likely | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | most likely |

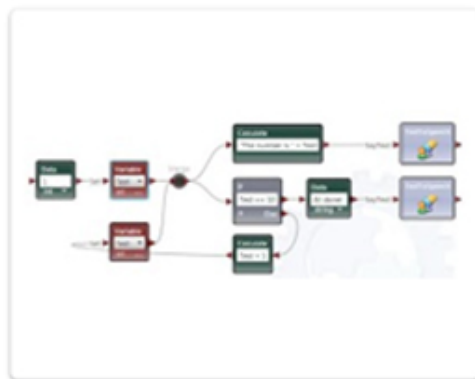
How much do you understand the tools/features in the text-based editors? *

| | 1 | 2 | 3 | 4 | 5 | |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| do not understand at all | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | absolutely understand |

Which do you prefer more to do programming? *

- ☐ Using keyboard to type to code
- ☐ Using mouse to interact/select to code
- ☐ Other: _____

Which of the following do you prefer more as an alternative way to program and learn? *

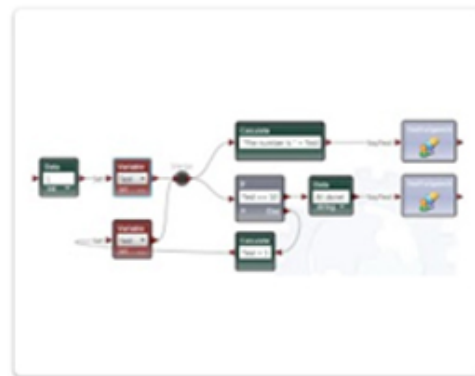


☐ Node-based



☐ Block-based

Which of the two do you find easier to learn and use? *



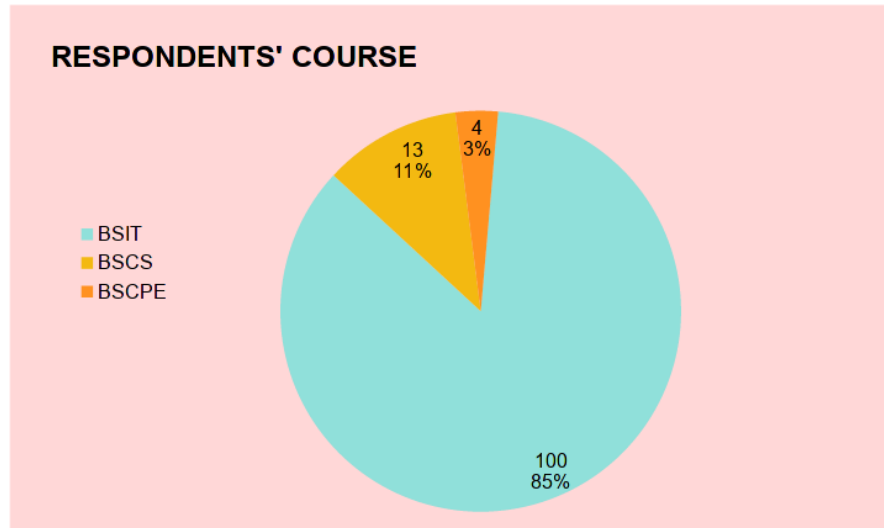
☐ Node-based



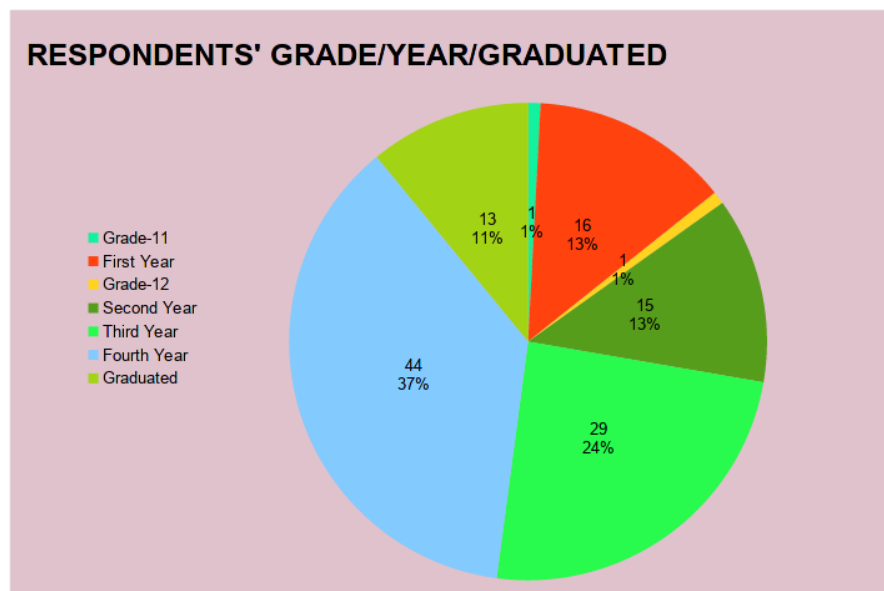
☐ Block-based

2. Survey Form

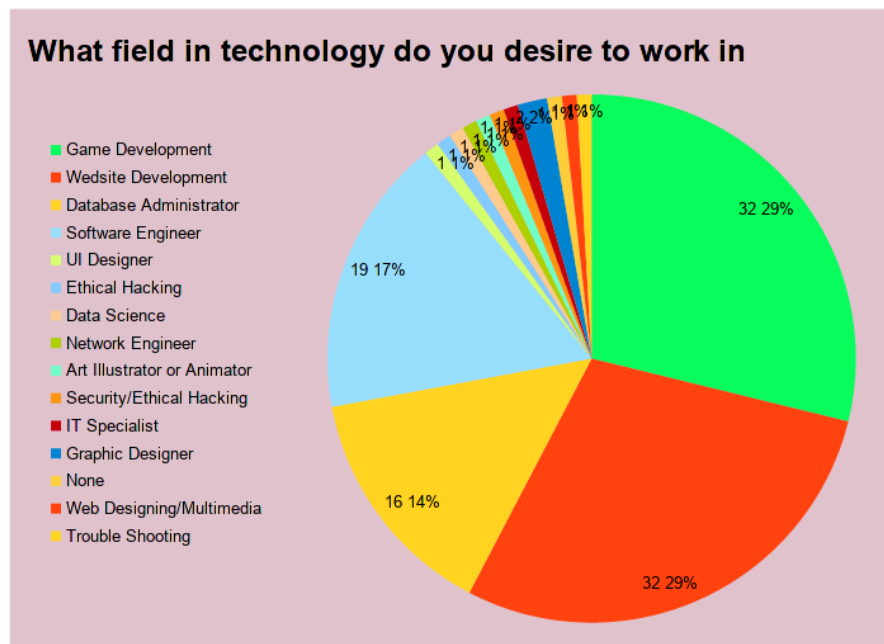
Appendix 2. Graphical Representation of Data



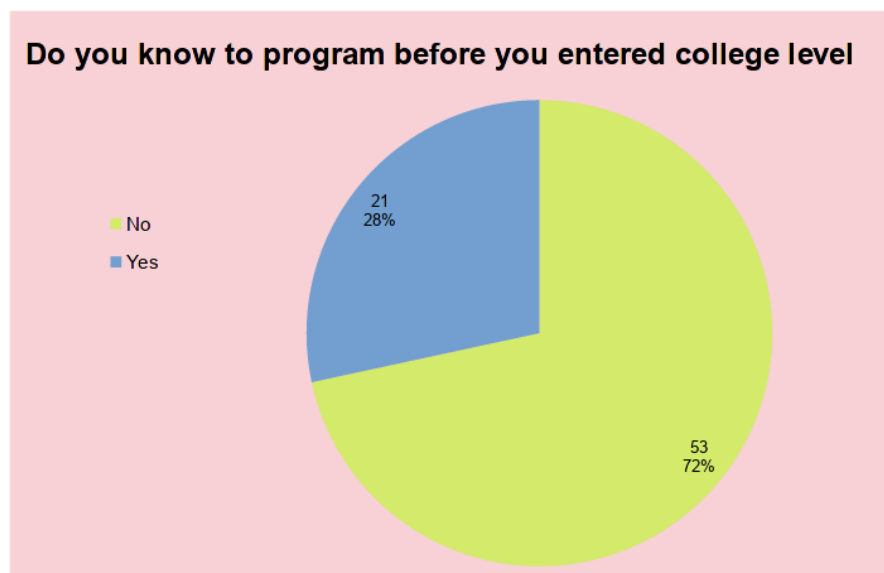
3. Graphical representation of the course of the respondents



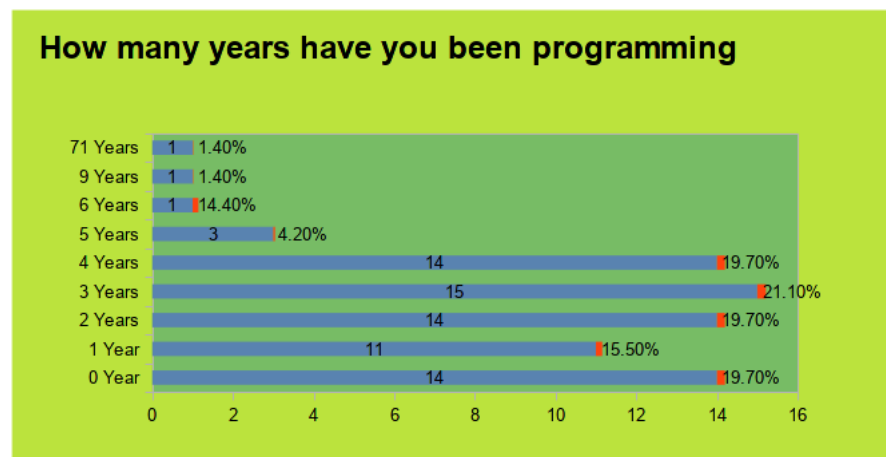
4. Graphical representation of the grade/year level of the respondents



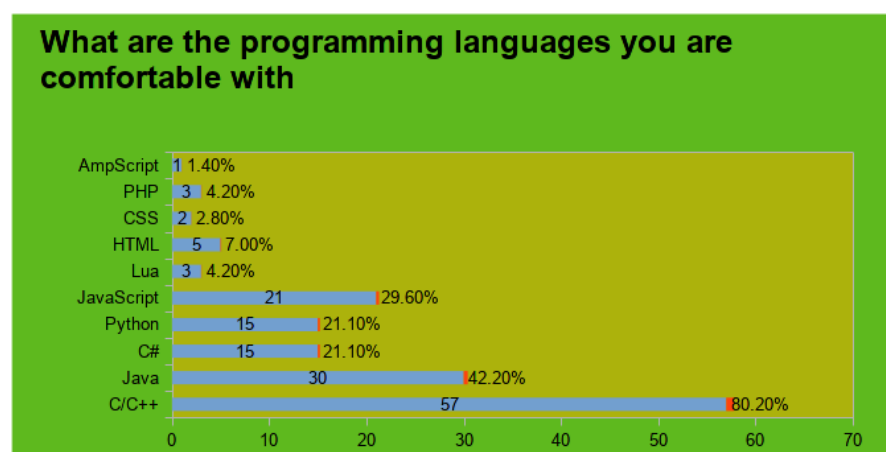
5. Graphical representation of the desired technology field of the respondents



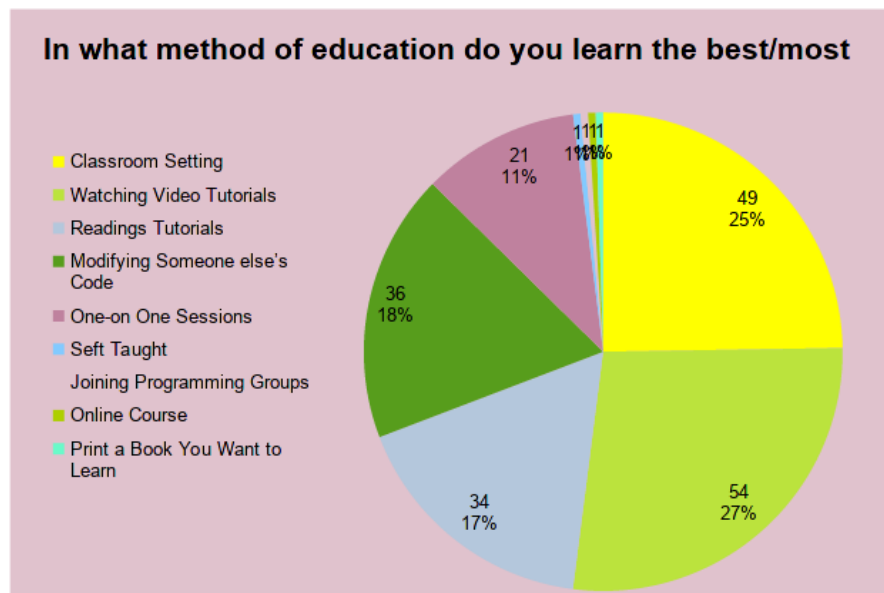
6. Graphical representation of the knowing programming before college of the respondents



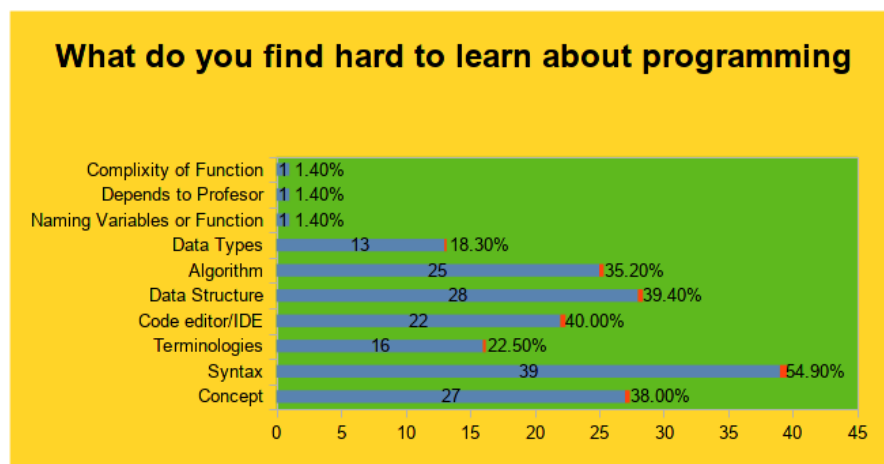
7. Graphical representation of the years programming of the respondents



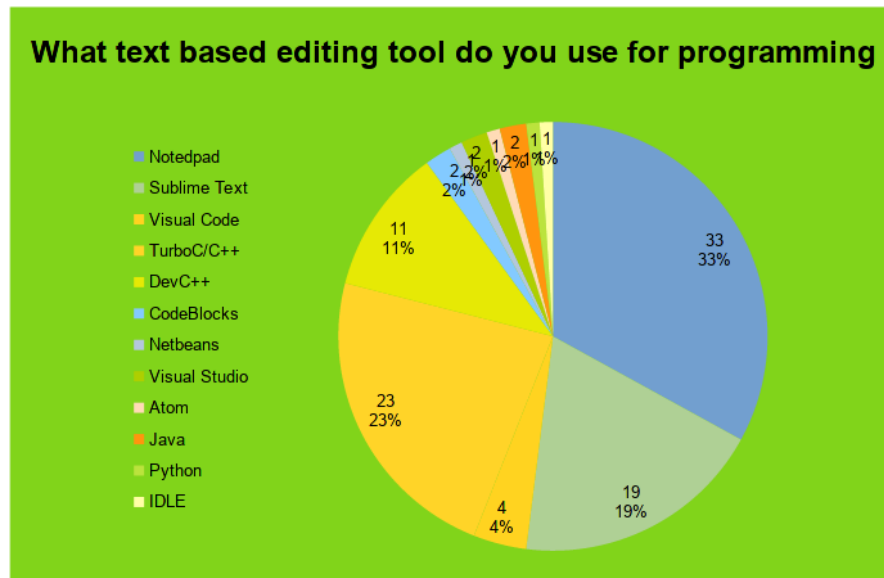
8. Graphical representation of the languages comfortable with of the respondents



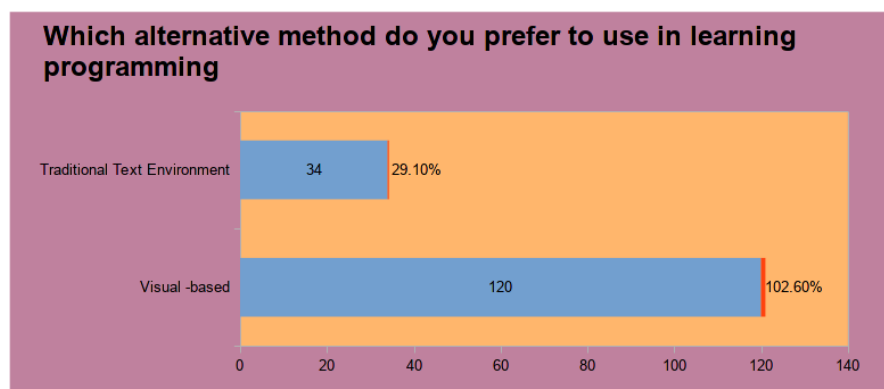
9. Graphical representation of the best learning method of the respondents



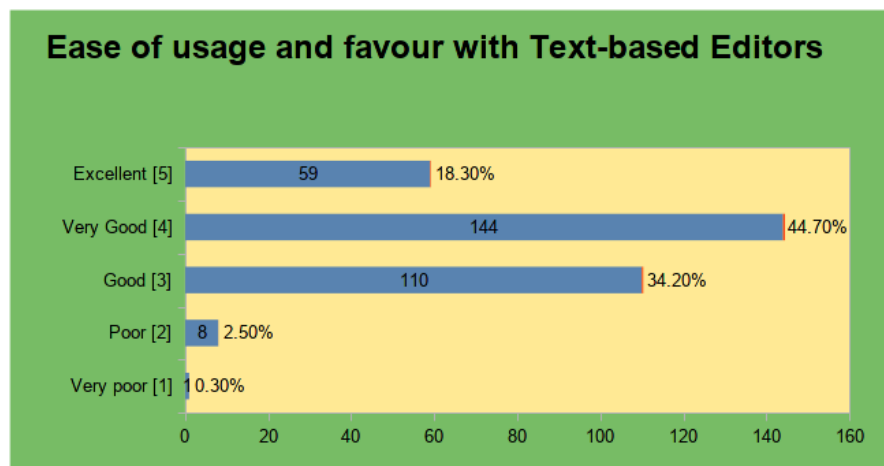
10. Graphical representation of the hard to learn in programming of the respondents



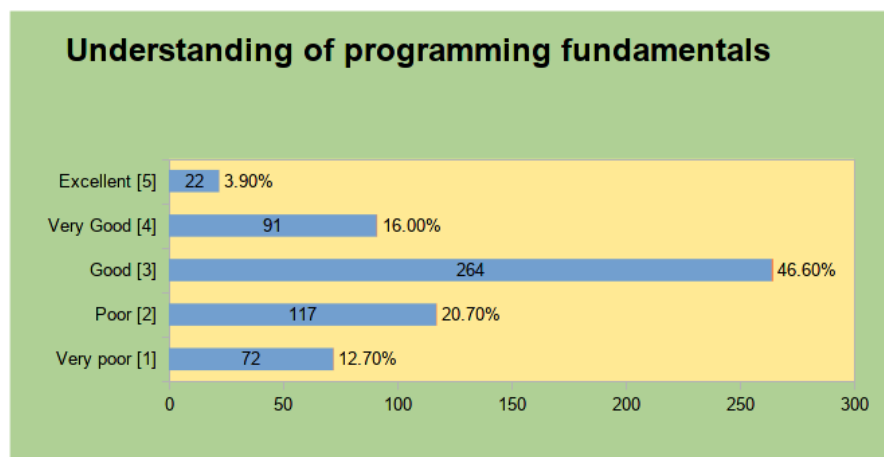
11. Graphical representation of the text-editing tool used of the respondents



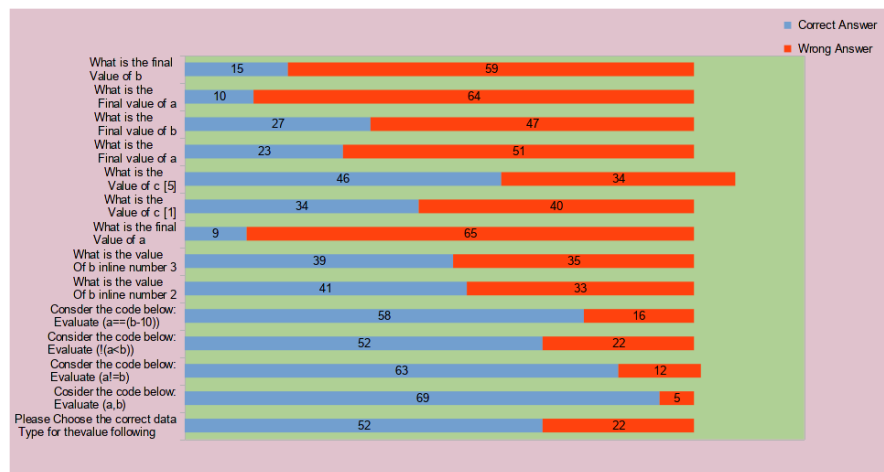
12. Graphical representation of the preferred alternative learning method of the respondents



13. Graphical representation of the text editors' usage ease of the respondents

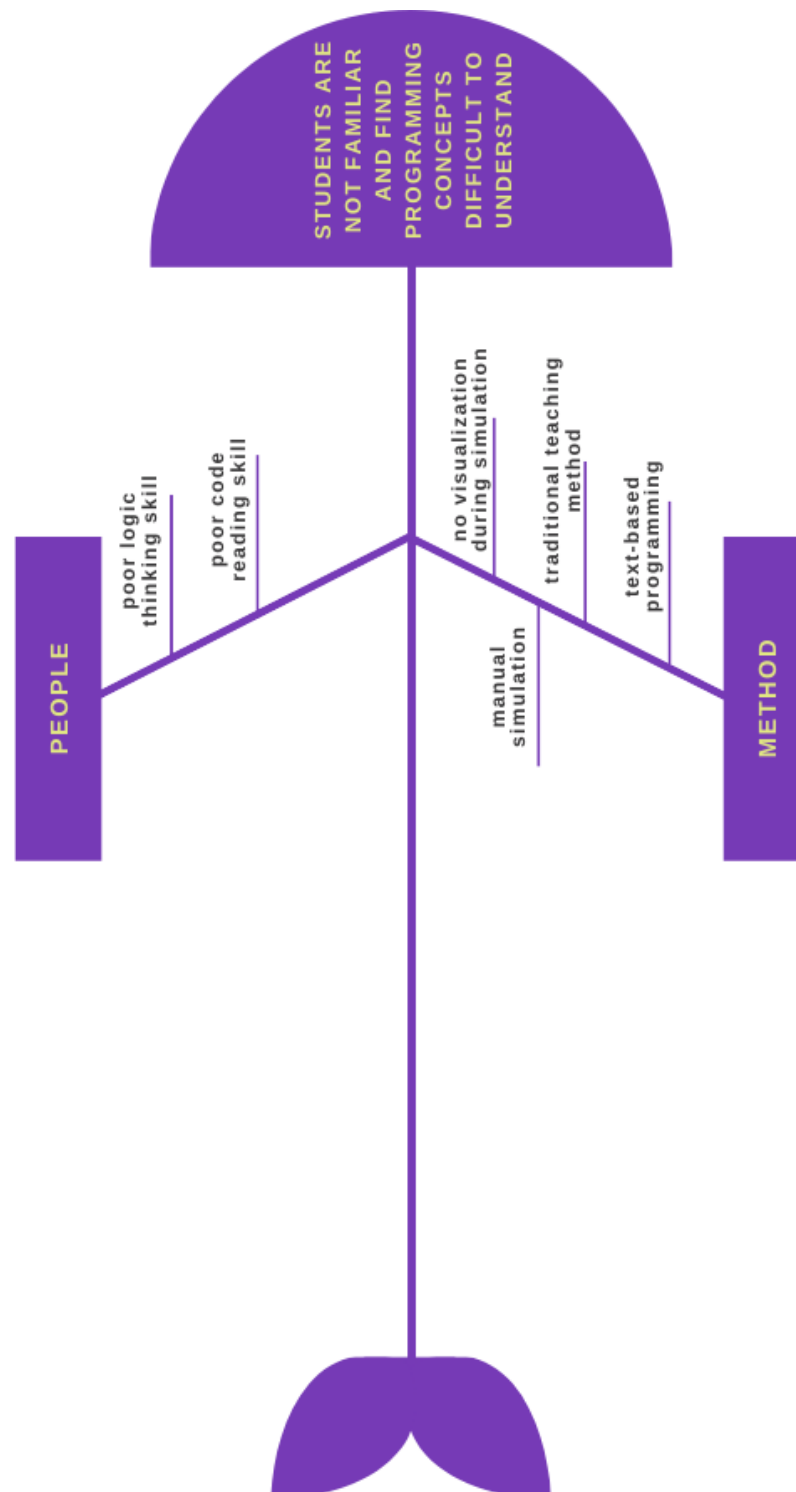


14. Graphical representation of the programming fundamentals understanding of the respondents

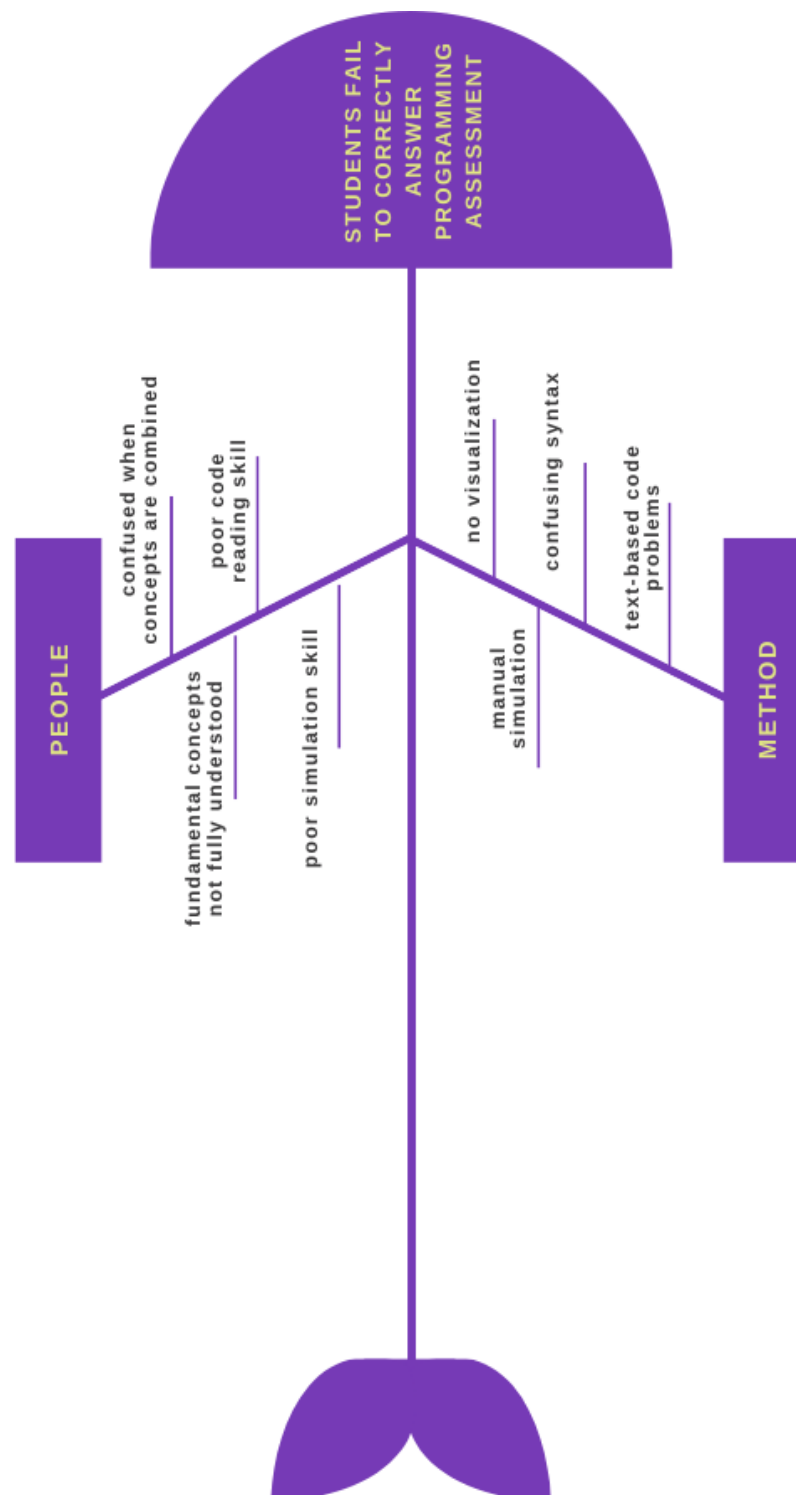


15. Graphical representation of the programming fundamentals assessment of the respondents

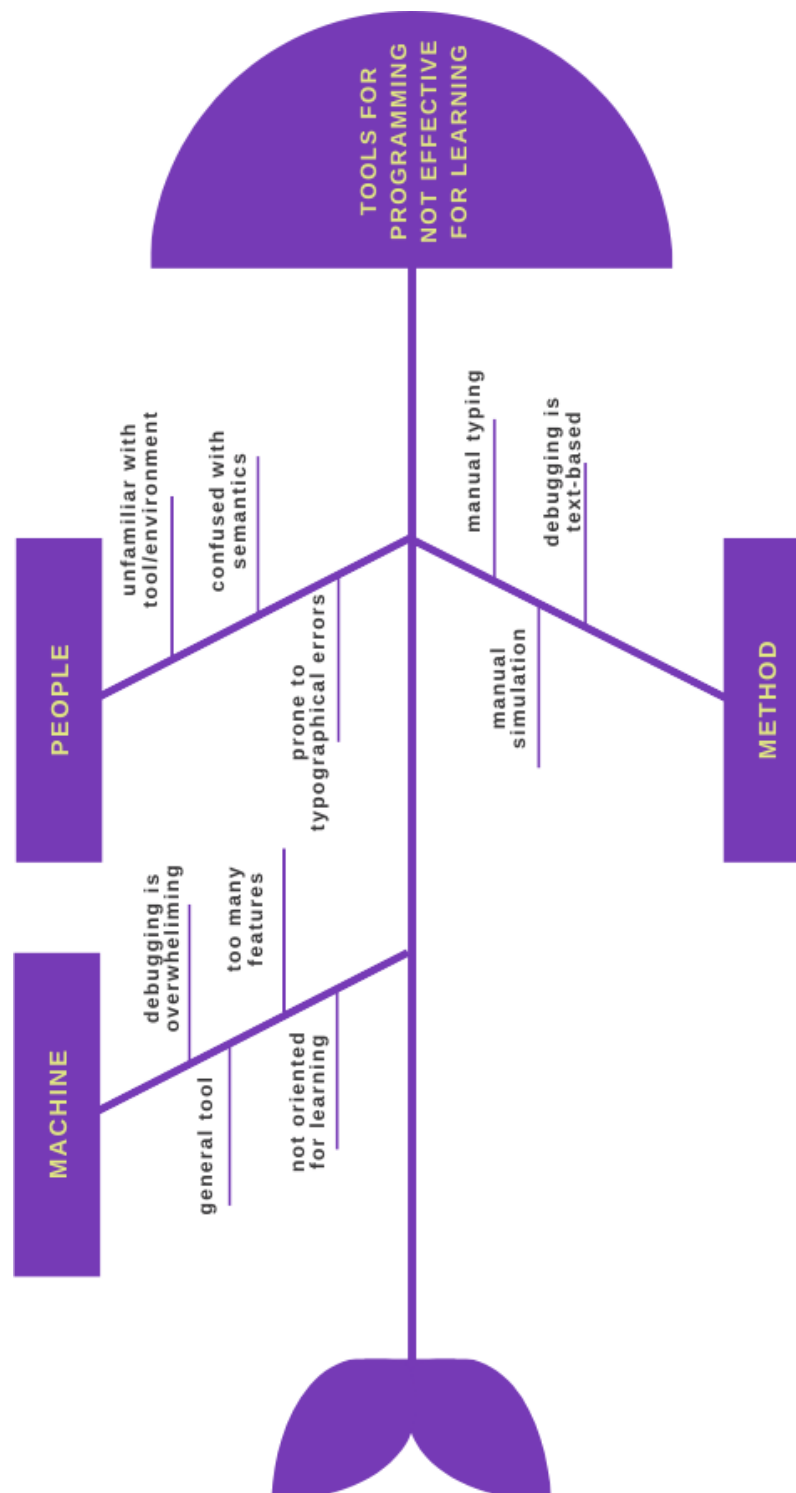
Appendix 3. Ishikawa Diagram



16. Fishbone diagram of the students not familiar and find programming concepts difficult to understand

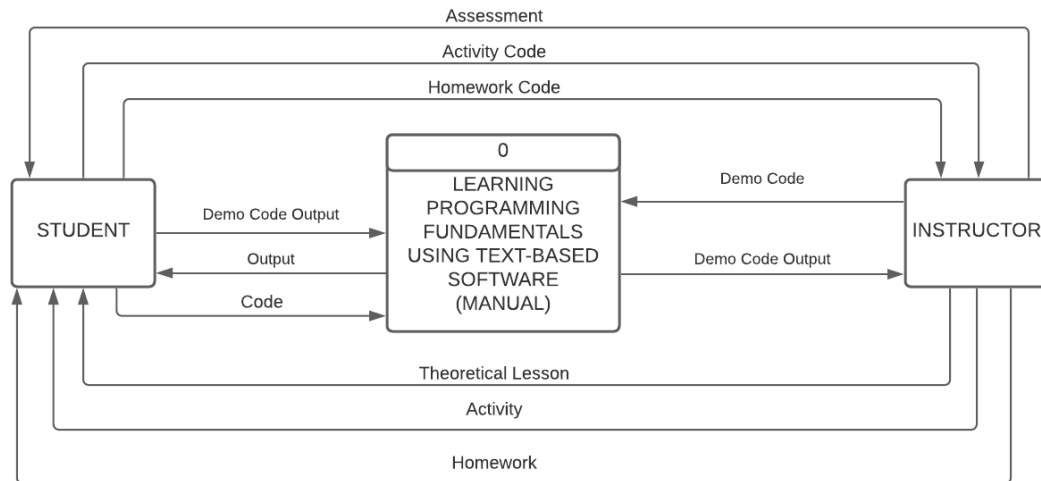


17. Fishbone diagram of the students incorrect answer to programming assessment

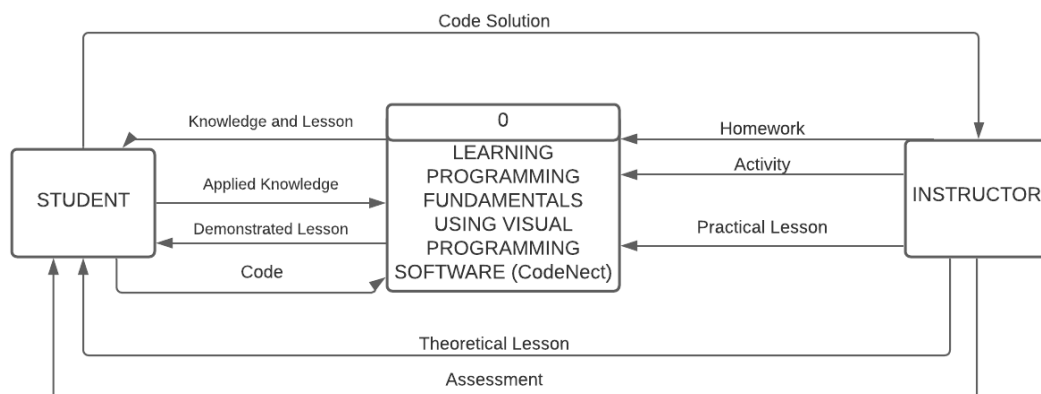


18. Fishbone diagram of the tool for programming not effective for learning

Appendix 4. Context Diagram

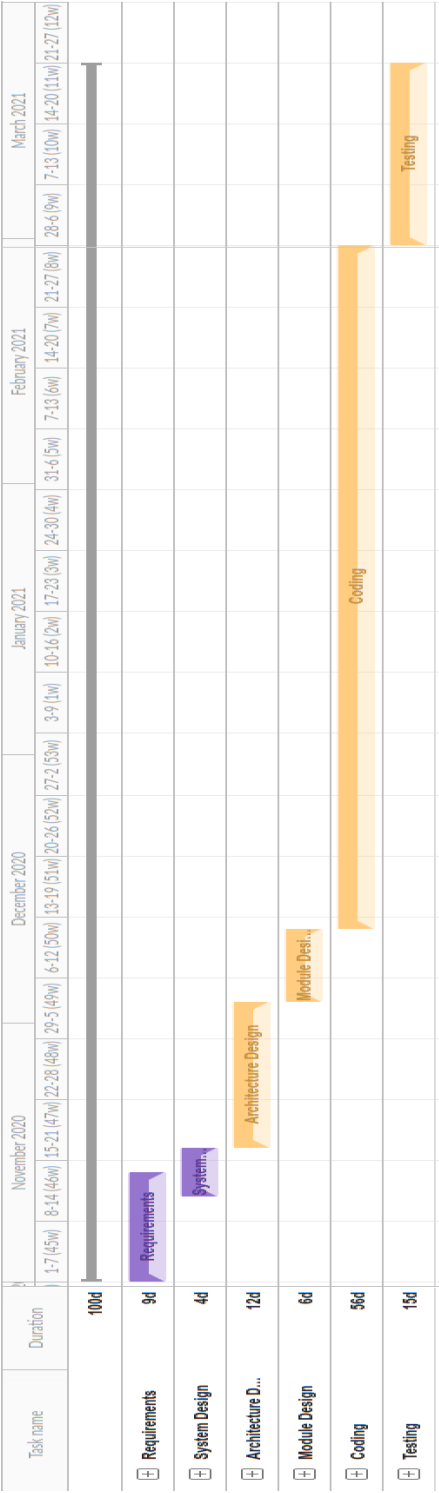


19. Context Diagram of Existing System



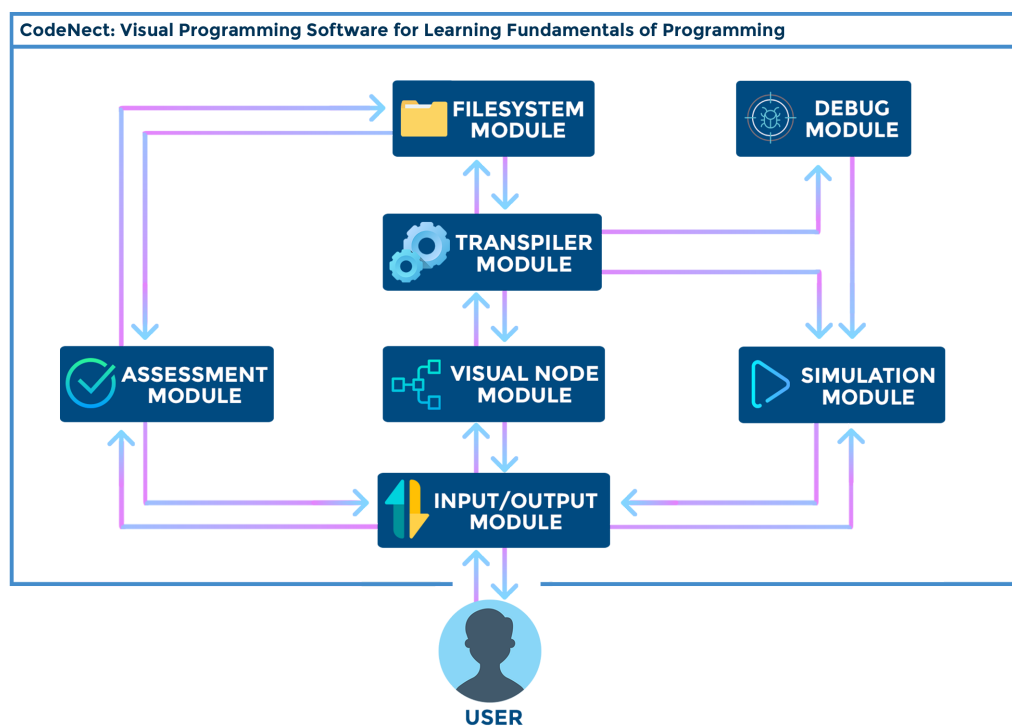
20. Context Diagram of Proposed System

Appendix 5. Gantt Chart



21. Gantt Chart of the Development of CodeNect

Appendix 6. Theoretical Framework



22. Theoretical Framework of CodeNect: Visual Programming Software for Learning Fundamentals of Programming