2.9 Iterations

By deleting the **Regulator_X** gene, which is found inside the operon L14 the while statement can be imitated meaning let S be an instruction and B a condition, which can be true or false, therefore the instruction S will be executed as long as B is true **(while B do S)**.

The trp is an α-amino acid that is used in the biosynthesis of proteins where trp operon is a group of genes that is transcribed together—that codes for the components for production of trp and therefore structure genes S and the boolean value of condition B can be true that is operator is free or false operator is blocked. Suppose the operon represents the state true the basic instruction is activated, and it will be active until the operator gene will be blocked and this logic simulates the while statement shown below in Fig. 3.

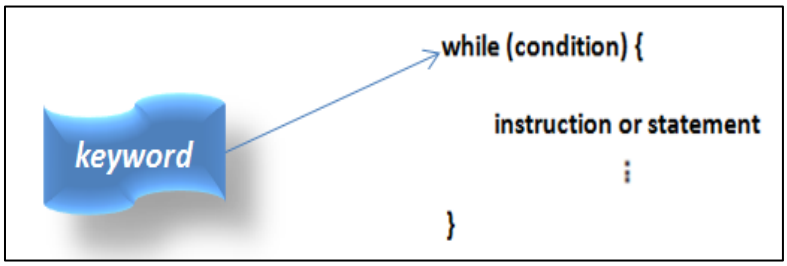

Fig. 3

From OOB the **Operator_X** is the condition and can be either true or false and the instruction or statement is the structure gene S therefore as long as the condition is true the statement will be executed inside the block **{…}** meaning **while B do S**.

Furthermore, it is possible to enhance the while loop into a do-while loop when execution of a loop must occur at least once shown below in Fig. 4.

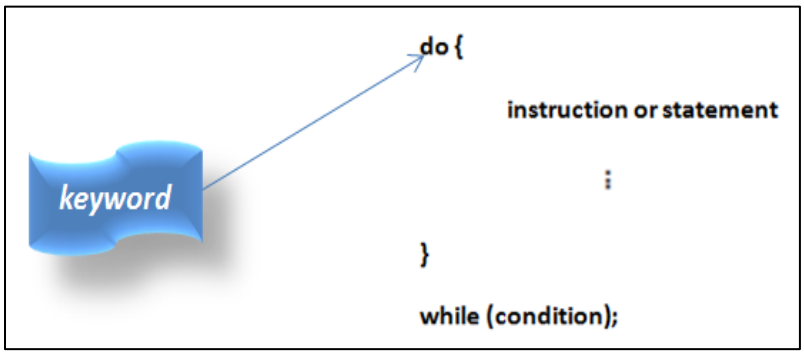

Fig. 4

The statement or instruction is executed first. Furthermore the condition is tested once the statement or instruction is executed meaning the statement or instruction is executed at least once meaning the operator is the B condition and can be either true or false and the instruction or statement S is the structure gene S therefore as long as the condition is true the instruction or statement will be executed inside the block **{…}** again.

The while loop can be extended into a for loop, it's a special form of the while loop by adding two minor things to it. First, initializing or defining a variable such as **i = start** where **i** is the variable, **start** is the contents, and **=** is the assignment

operator meaning start is stored in **i**. Second, the increment value will be added to the code below in the following way **i = i+1** meaning add one to the variable **i** and store the result in **i**. The next time the stored variable **i** will add one again to the stored variable **i** and so on. Also, it is possible to decrement by one like so **i = i-1**. In general, it is possible to increment and decrement by any number. There is shorthand for the expressions, which can be used such as increment by one **i++** and decrement by one **i--**.

```
i = start;

while (condition) {

        i++;

}
```

The while loop has a starting point **i = start**. While the condition is true an increment by one in the while loop body **{…}** will occur. The extended while loop can be transformed into a for loop shown below in Fig. 5.

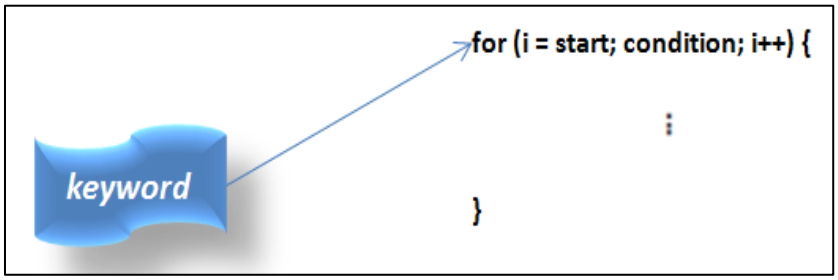

Fig. 5

The for loop has a starting point **i = start**, a **condition**, and an **increment**. Furthermore, the variable **i** is applied to the condition by comparison and if it is true the for-loop body **{…}** will be executed and afterwards incremented, but if it is false the for-loop body will not be executed, and no increment will occur.

In this sub-section the relationship of a cell and receptor was related to object and method. Also, the update process was discussed that is how a method updates the object. In addition, data types, if statements and various loops were presented. In the next sub-section OOC will be applied to an OOP language like Java.

2.10 Self-Check Questions for the Iterations Sub-Section

1. Where is the Regulator_X found? Inside the operon L14
2. What is the minimum times the do-while loop will execute? Once
3. What loop is the basis for the for loop? The while loop