**APO II: Tarea integradora 1**

Complementary document to TI1 APO, This document contains the requirements for the development of the PipeMania game, identified by:

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**Problem specification**

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| Client | Project leader (teacher) |
| User | Students and other players |
| Functional requirements | R1. The 8x8 board should be randomly generated and solvable.  R2. It must be possible to place one of the 3 types of pipes in a space of the board.  R3. The program must correctly validate the connection from Fuente(F) to Drenaje(D).  R4. The program must have a scoring system.  R5 The program must be able to display the players' score table.  R6 The program must have a way to close or exit the game.  R7 The program must be able to register players who start a game. |
| Context/problem world | A company that needs to build a piping simulator game, with certain rules and functions to be used effectively by the user. |
| Non-functional requirements | * Display the game instructions before starting the game. |

**Requirements specification**

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| NAME OR IDENTIFIER | R1. The 8x8 board should be randomly generated and solvable. | | |
| SUMMARY | The program will provide the player with an automatically generated 8x8 board and will randomly set the starting point F and end point D. | | |
| INPUTS | Name of input | Data type | Selection or repetition condition |
| colum | int | —-- |
| row | int | —-- |
| GENERAL ACTIVITIES NECESSARY TO OBTAIN THE RESULTS | Multiply the columns with the rows to set the size of the board and know how many nodes to create. | | |
| RESULT OR POSTCONDITION | creation of an 8x8 board with a starting point F and an end point D, 64 nodes/positions to place the pipelines | | |
| OUTPUTS | Output name | Data type | Selection or repetition condition |
| board | String | —-- |

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| NAME OR IDENTIFIER | R2. It must be possible to place one of the 3 types of pipes in a space of the board. | | |
| SUMMARY | Three types of pipes are presented to the users, horizontal, circular and vertical pipes, to allow the flow from the source to the drainage, taking into account the rules established for the correct operation of the game. | | |
| INPUTS | Name of input | Data type | Selection or repetition condition |
| source F | String | -------- |
| source D | String | -------- |
| typeHorizontal(=) | String | -------- |
| typeVertical(||) | String | -------- |
| typeNinety(o) | String | -------- |
| GENERAL ACTIVITIES NECESSARY TO OBTAIN THE RESULTS | The input values are entered by the users, and should be displayed on the board, and repeated until you consider the game to be finished. | | |
| RESULT OR POSTCONDITION | The result is a reflection on the map of the way the user arranged the pipes in the game. | | |
| OUTPUTS | Output name | Data type | Selection or repetition condition |
| board | String | --------- |

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| NAME OR IDENTIFIER | R3. The program must correctly validate the connection from Fuente(F) to Drenaje(D). | | |
| SUMMARY | The program must check the pipelines laid and validate that they all connect and link points F and D. | | |
| INPUTS | Name of input | Data type | Selection or repetition condition |
| thePipe | Pipe | pipeType = “=” || “o” || “||” |
|  |  |  |
| GENERAL ACTIVITIES NECESSARY TO OBTAIN THE RESULTS | verificar la conexión de los nodos llamados "Pipe" y saber si el estado del nodo siguiente es una tipo de tubería o la conexión final D | | |
| RESULT OR POSTCONDITION | board check, "end of game" will be displayed if connections comply with game instructio | | |
| OUTPUTS | Output name | Data type | Selection or repetition condition |
| gameStatus | String | —--- |

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| NAME OR IDENTIFIER | R4. The program must have a scoring system. | | |
| SUMMARY | The game should be allowed to display the player's score, taking into account some values such as pipes used and time elapsed, if the user selects that he wants to see the score. | | |
| INPUTS | Name of input | Data type | Selection or repetition condition |
| pipesUsed | int |  |
| timeInSeconds | int | -------- |
| GENERAL ACTIVITIES NECESSARY TO OBTAIN THE RESULTS | To obtain the result of the points, a formula must be made which consists of: multiplying the amount of pipes used by 100, subtracting the value of 60 minus the time in seconds, and this is multiplied by 10. | | |
| RESULT OR POSTCONDITION | The score value of the user who was playing the game is obtained as a result. | | |
| OUTPUTS | Output name | Data type | Selection or repetition condition |
| points | int |  |

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| NAME OR IDENTIFIER | R5 The program must be able to display the players' score table | | |
| SUMMARY | At the end of a game and after the calculation of the player's final score, the program should have an option to display the current score table | | |
| INPUTS | Name of input | Data type | Selection or repetition condition |
| score | int | —-- |
| player | Player | —-- |
| GENERAL ACTIVITIES NECESSARY TO OBTAIN THE RESULTS | the data must be stored in a structure such as arraylist and after the score table option is called, print the scores in order. | | |
| RESULT OR POSTCONDITION | shows the score table | | |
| OUTPUTS | Output name | Data type | Selection or repetition condition |
| scoreTable | String | —-- |

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| NAME OR IDENTIFIER | R6 The program must have a way to close or exit the game. | | |
| SUMMARY | When the game ends or after the player is satisfied with the game, he/she should have an option to exit the game and end the program | | |
| INPUTS | Name of input | Data type | Selection or repetition condition |
| option | String | —-- |
|  |  | —-- |
| GENERAL ACTIVITIES NECESSARY TO OBTAIN THE RESULTS | The player's decision is validated, if he/she decides "yes" the program must end, otherwise he/she can continue playing. | | |
| RESULT OR POSTCONDITION | termination of the program if the "yes" option was chosen | | |
| OUTPUTS | Output name | Data type | Selection or repetition condition |
| closeMenssage | String | option=yes |

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| NAME OR IDENTIFIER | R7 The program must be able to register players who start a game. | | |
| SUMMARY | The program must register the players in order to know to whom specifically to score. | | |
| INPUTS | Name of input | Data type | Selection or repetition condition |
| name | String | —-- |
|  |  | —-- |
| GENERAL ACTIVITIES NECESSARY TO OBTAIN THE RESULTS | The player object is created and stored in an arraylist. | | |
| RESULT OR POSTCONDITION | player registration | | |
| OUTPUTS | Output name | Data type | Selection or repetition condition |
| nameConfirmation | String | —-- |