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|  | |  |  | | --- | --- | |  |  | | **1(a).** | A group of A-level students are working together to program a computer game.  In the game, the player controls a character who moves through a virtual world. The game starts with a load-up screen. The player can select which area to move to on an on-screen map, and then they control the movements of their character using a keyboard to solve puzzles on the screen.  Identify **two** inputs that the user could enter to control the character and describe each input’s function.     |  |  |  | | --- | --- | --- | | Input 1 | W |  | | use | Mover player forward |  | | Input 2 | S |  | | use | Move player backwards | **[4]** | | |

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|  | |  |  | | --- | --- | |  |  | | **(b).** | The game is to be created using sub-procedures. The following table identifies and describes one sub-procedure the students could use.  Complete the table below, identifying **three** additional sub-procedures that the students could create from the description at the start of question **2**.  Describe the purpose of each sub-procedure you have identified.     |  |  |  | | --- | --- | --- | |  | **Sub-procedure** | **Purpose** | | e.g. | characterMovement | Takes the key the player pressed and moves the character in that direction | | 1 | loadUpScreen | Display a map to allow the player to pick a location to move to | | 2 | spawnPlayer | Spawns the player in the location picked from the loadUpScreen | | 3 | checkPuzzleStatus | Checks if puzzle is completed correctly |      |  |  | | --- | --- | |  | **[6]** | | |

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|  | |  |  | | --- | --- | |  |  | | **(c).** | The following pseudocode algorithm is for the sub-procedure characterMovement.     1. Identify the **three** parameters in the procedure characterMovement.      |  |  |  | | --- | --- | --- | | 1 | inputKey |  | | 2 | Characterx |  | | 3 | charactery |  |  |  |  | | --- | --- | |  | **[3]** |  1. Describe the decision that is made in this procedure and how the decision affects the flow through the procedure.   It is checking the value of inputKey against 4 valus depending on the value either the Characterx or the Charactery will be increased or decreaced by 1        **[3]**   1. Explain why characterx and charactery are passed byRef and not byVal.   Because you want to update the variable not create a new one and then update that this is because otherwhise the player wont know the values have changed and therefore the player wont move on screen as new variables have been created updated then deleted      **[3]** | |

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|  | |  |  | | --- | --- | |  |  | | **(d).** | Discuss the need for, and benefits of, the students producing and using reusable program components in the development of the game.                                        **[9]** | |

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|  | |  |  | | --- | --- | |  |  | | **2(a).** | A procedure takes as input a number between 1 and 100. It calculates and outputs the square of each number starting from 1, to the number input. The square of a number is the result of multiplying a number by itself.    The procedure uses one programming construct twice.  State whether the construct that is used twice, is iteration or branching.  **[1]**  It is iteration as no decision is being made just looping | |

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|  | |  |  | | --- | --- | |  |  | | **(b).** | State why the algorithm is a procedure and not a function.    Because it doesn’t return a number  **[1]** | |

**END OF QUESTION PAPER**