Zig Zag Education

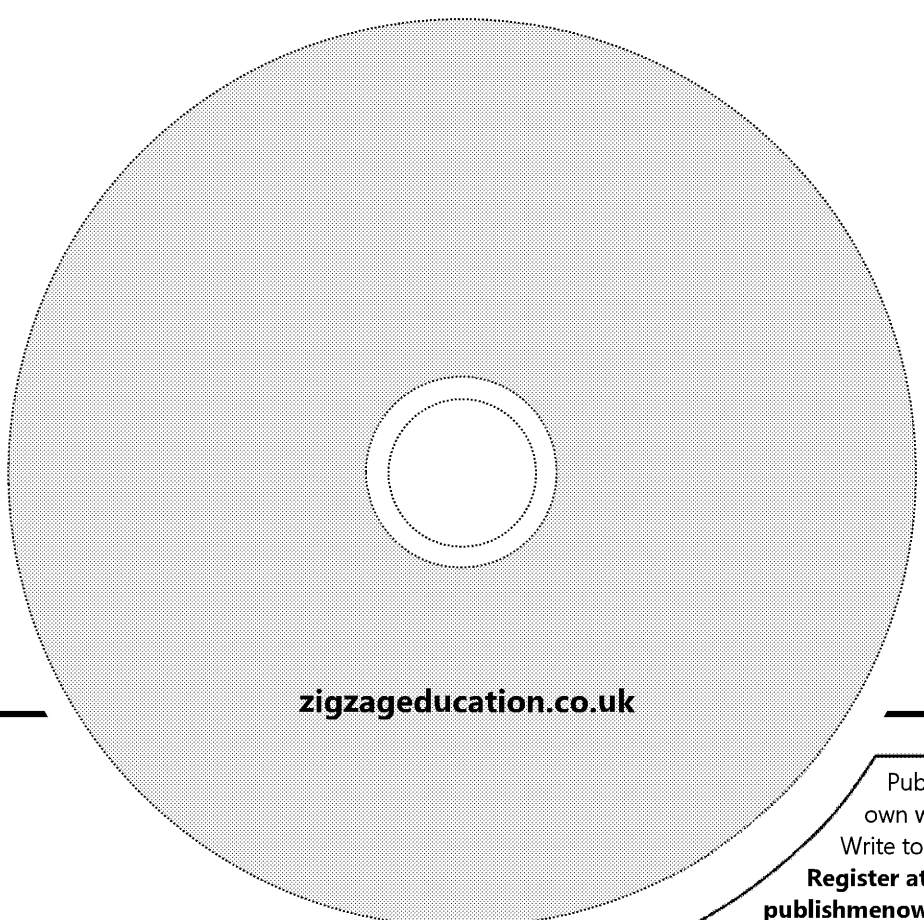
Computer Science A Level | AQA | 7517

PAPER 1 EXAM RESOURCE PACK 2018

WORDS WITH AQA

PYTHON3

for A Level AQA Computer Science



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Contents

Printouts of CD resources (for reference)

Teacher's Introduction

This resource pack is designed to help you support your students taking the **A Level Computer Science Paper 1** examination. It is based on the **'Words with AQA'** preliminary material (Python3) – for examination June 2018.

New Format: The biggest improvement in this 2018 resource pack sees all content provided electronically* for the first time. On the CD, you will find the following files.

`WordsWithAQA`	for student use – this folder contains all of the content, accessible via a HTML interface
`editable`	for teacher use – this folder contains ALL of the documents in editable (docx /pptx) formats
`Passwords.txt`	for teacher use – this file contains all of the passwords for the protected PDFs (also listed below)

* PRINTED COPIES OF ALL THE MATERIALS IN THIS DIGITAL RESOURCE PACK ARE INCLUDED FOR REFERENCE.

Installation: Copy the entire `WordsWithAQA` folder onto a network location that is accessible for students, and provide them with a shortcut to the index.html file. All content can be accessed from this page.

Passwords: All of the PDFs in the 'Answers & Solutions' HTML page (`answers.html`) are password-protected, so that students can only access them with your permission. Each password is a four-digit code, as follows:

`Commentary.pdf`	`1158`
`Diagram1Complete.pdf`	`4773`
`Diagram2Complete.pdf`	`5382`
`Diagram3Complete.pdf`	`3091`
`QuestionsMarkScheme.pdf`	`7642`
`TaskMarkScheme.pdf`	`2966`

Should you wish to give students access to ALL protected-PDFs, the master password for all files is:

`zz2ghc4`

The resource pack consists of the following:

① **Pre-release Commentary**, consisting of two parts:

- A general walkthrough of the skeleton program; a written description, flowchart and an animated PowerPoint giving a visual demonstration of the game. It is non-technical in the sense that it doesn't reference or explain any actual code elements – only how the program works when it is run.
- A detailed, technical overview of the skeleton program, describing how all Python subroutines, classes and variables work, including the relationship between them.

Note: although this section is intended to give extra support to teachers and students, it should in no way be seen as a substitute to a student exploring the code for themselves. For this reason, this content has been placed on the 'Answers & Solutions' HTML page as a password-protected file, to allow you to control if/when students access it.

② **Structure Diagram Activities**

Three partially complete structure diagram activities for students to complete while getting to grips with the skeleton program. Any missing identifiers, data types, return values, directional arrows, etc. must be added to the diagram. Solutions are provided on the *Answers & Solutions* page as a protected PDF.

③ **Written Questions**

Theory questions testing students' understanding of the 'Words with AQA' code, like Section C in the exam. These questions require access to the skeleton code, but no modifications need to be made to the program. Write-on (with answer lines) and non-write-on version are available format. Solutions are provided on the *Answers & Solutions* page as a protected PDF.

④ **Programming Tasks**

Fifteen modification exercises put students' programming skills to the test, like Section D in the exam. Solutions are provided on the *Answers & Solutions* page as a protected PDF. Note that these are example solutions and you must use your discretion to award marks accordingly where there are valid alternative solutions.

Free Updates

Register your email address to receive any future free minor updates made to this resource or other Computing resources your school has purchased, and details of any promotions for your subject.

** resulting from minor specification changes, suggestions from teachers and peer reviews, or occasional errors reported by customers*

zzed.uk/freeupdates

An **Electronic Answer Document (EAD)** is provided should you wish students to use it for ③ and/or ④ above.

Introduction

Words with AQA is a game in which two human players take turns to make words from tiles that have been dealt to them.

When the game begins, a queue of tiles is created, in which 20 tiles are generated. Tiles are removed from the front of the queue and, once removed, are replaced by an identical tile at the end of the queue. The tile queue can be replenished any number of times, so the same tiles can be used.

When the game begins, Player One and Player Two are each assigned 15 tiles taken from the queue, their scores are set to 50. An array is also assembled from a text file, which contains the words that can be played. The players then take turns, with each turn following this format:

1. The player attempts to play a word using their tiles (each tile can only be played once, so if the word 'HAMMER' were to be attempted, the player would need two 'M' tiles).

   Each letter tile has an integer value, which determines the score, so the word 'HAMMER' would be worth 11 points.

A_1	B_2	C_2	D_2	E_1	F_3	G_2	H_3	I_1
N_1	O_1	P_3	Q_{10}	R_1	S_1	T_1	U_2	V_3

2. After the word is played, the program checks that it exists in the array of legal words. What happens next depends on whether the word is allowed.

   a. If the word is allowed, that word's score is calculated using the tile values. If the word is seven characters long, 5 bonus points are awarded. If the word is eight characters long, 10 bonus points are awarded. They may then choose how many new tiles they wish to take from the queue, from the following options:

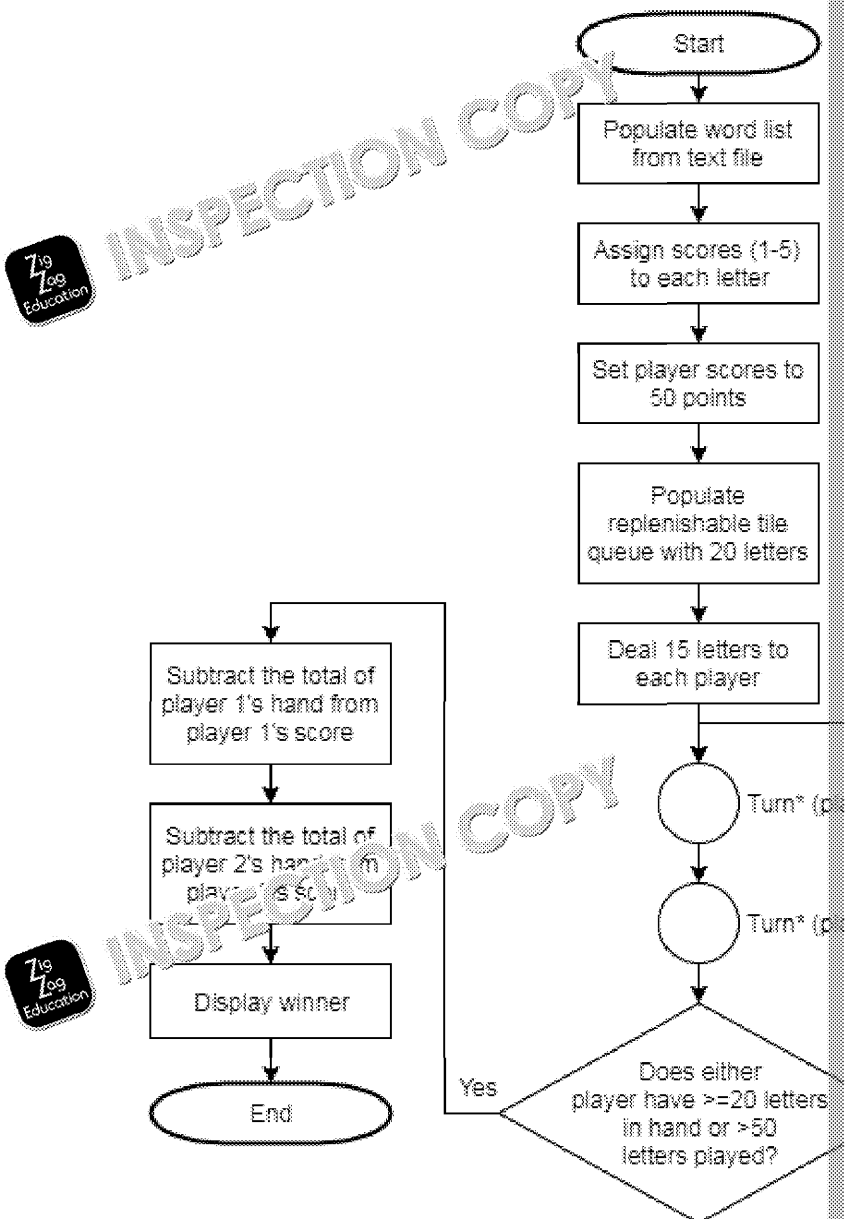
      - three tiles
      - a number of tiles equal to the length of the played word (so four tiles for a four-letter word)
      - a number of tiles equal to the length of the word plus three (so seven tiles for a four-letter word)
      - no tiles

   b. If the word is not allowed (is not in the array), the player's turn is over, they are not permitted to attempt a second word. They are then given three penalty points.

The game continues until either player has played a total of more than 50 tiles or has 0 tiles (or more) in their hand. If either of these is true after Player One's turn, Player Two has one more turn. The game ends after Player Two's turn.

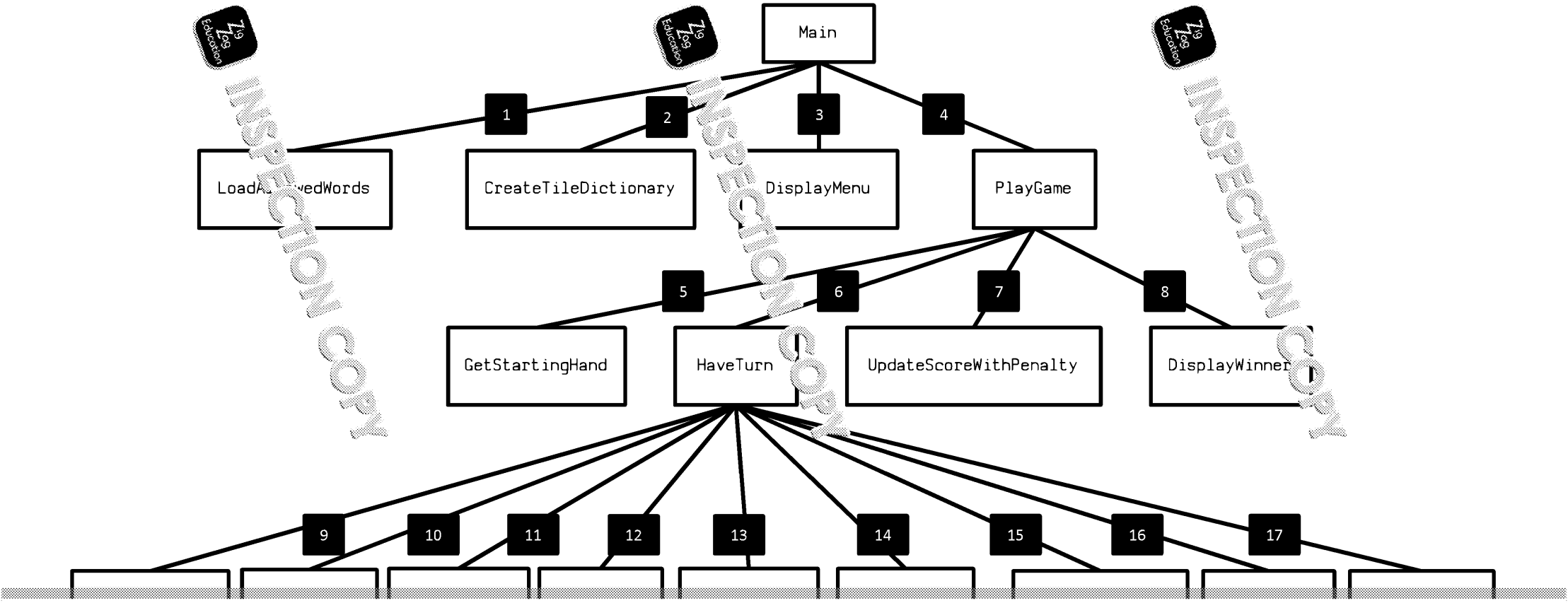
At the end of the game, the total value of each player's hand is subtracted from their score. The highest score is the winner.

Program Flowchart



* For the details of the 'turn' subroutines, see steps 1 and 2 on th

Structure Diagram: Overview



Subroutine Calls, Parameters and Return Values

The numbers to the left do **not** indicate the order in which subroutines are called, as there are multiple possible orders. Instead, these numbers relate to the numbers in the structure diagram on page 3.

Call	Parameters	Return
1 Main calls LoadAllowedWords	-	AllowedWords
2 Main calls CreateTileDictionary	-	TileDictionary
3 Main calls DisplayMenu	-	-
4 Main calls PlayGame	AllowedWords TileDictionary RandomStart StartHandSize MaxHandSize MaxTilesPlayed NoOfEndOfTurnTiles	-
5 PlayGame calls GetStartingHand	TileQueue StartHandSize	Hand
6 PlayGame calls HaveTurn	PlayerName PlayerTiles PlayerTilesPlayed PlayerScore TileDictionary TileQueue AllowedWords	PlayerTiles PlayerTilesPlayed PlayerScore TileQueue

Call	Parameters	Return
11 HaveTurn calls DisplayTileValues	TileDictionary AllowedWords	-
12 HaveTurn calls FillHandWithTiles	TileQueue PlayerTiles MaxHandSize	TileQueue PlayerTiles
13 HaveTurn calls CheckWordIsInTiles	Word PlayerTiles	InTiles
14 HaveTurn calls CheckWordIsValid	Word AllowedWords	ValidWord
15 HaveTurn calls UpdateAfterAllowedWord	Word PlayerTiles PlayerScore PlayerTilesPlayed TileDictionary AllowedWords	PlayerTiles PlayerScore PlayerTilesPlayed
16 HaveTurn calls GetNewTileChoice	-	NewTileChoice
17 HaveTurn calls AddEndOfTurnTiles	TileQueue PlayerTiles NewTileChoice Choice	TileQueue PlayerTiles
18 UpdateAfterAllowedWord calls GetScoreForWord	Word TileDictionary	Score

Program Subroutines

The functions Ⓕ and procedures Ⓟ are described below.

Main Program Subroutines	Description	
`AddEndOfTurnTiles` Ⓕ	Parameters: `TileQueue`, `PlayerTiles`, `NewTileChoice`, `Choice` Returns: `TileQueue, PlayerTiles` CalledFrom: `HaveTurn` Calls: `QueueOfTiles.Add`, `QueueOfTiles.Remove`	1. If the user has entered option 1 (in GetNewTileChoice()) set `NoOfEndOfTurnTiles` to contain the number of tiles played in the last move 3. If the user has entered option 2, set `NoOfEndOfTurnTiles` to contain the number 3 4. If the user has entered neither 1 nor 2 set `NoOfEndOfTurnTiles` to contain the number of tiles played plus 3 5. Set up a loop that runs once per tile to be drawn 6. Add a character to the string containing the player's hand by removing a tile from the front of the tile queue 7. Add a tile to the back of the tile queue
`CheckWordIsInTiles` Ⓕ	Parameters: `Word`, `PlayerTiles` Returns: `InTiles` Called from: `HaveTurn` Calls: -	1. Create a Boolean variable (`InTiles`) set to true 2. Create a copy of the player's tiles 3. Loop through the word being checked 4. For each character in the word, check that it exists in the copy of player's tiles 5. If it is present, it is removed from the copy of the player's tiles 6. If it is not present, `InTiles` is set to false 7. Return `InTiles` to `HaveTurn`
`CheckWordIsValid` Ⓕ	Parameters: `Word`	1. Create a Boolean variable (`ValidWord`) set to false

Main Program – Subroutines	Description	
`CreateTileDictionary` Ⓕ	Parameters: - Returns: `TileDictionary` Called from: `Main` Calls: -	1. Create an empty dictionary. 2. Set up a loop that runs 26 times 3. For each iteration, add the [illegible]ponding letter to the map (first add A, then add B, etc.) 4. For each letter, add the corresponding score (1, 2, 3 or 5), which depends on the letter 5. Return the dictionary to `Main`
`DisplayMenu` Ⓟ	Parameters: - Returns: - Called from: `Main` Calls: -	1. Present options to play the game [illegible] a random start, training start (string literals) or quit (this subrou[illegible] does not accept input or return a value)
`DisplayTilesInHand` Ⓟ	Parameters: `PlayerTiles` Returns: - Called from: `HaveTurn` Calls: -	1. Output a blank line 2. Output the player's hand
`DisplayTileValues` Ⓟ	Parameters: `TileDictionary` `AllowedWords` Returns: - Called from: `HaveTurn` Calls: -	3. Loop through the `TileDictionary` dictio[illegible] 4. Display each entry in the dictionary in the fo[illegible] 'Points for A: 1', with each entry on a different line
`DisplayWinner` Ⓟ	Parameters: `PlayerOneScore` `PlayerTwoScore` Returns: - Called from: `PlayGame` [illegible]	1. Display 'GAME OVER!' message 2. Display "Player One your score is" concatenated with PlayerOneScore 3. Display "Player Two your score is" concatenated with [illegible]

Main Program – Subroutines	Description	
`GetChoice` Ⓕ	Parameters: - Returns: `Choice` Called from: `HaveTurn` Calls: -	1. Present the player with the mid-game menu 2. Prompt the user to select a number or enter a word 3. Convert their entry to upp 3. Return this selection to Ha
`GetNewTileChoi` Ⓕ	Parameters: - Returns: `NewTileChoice` Called from: `HaveTurn` Calls: -	1. Declare an empty string 2. Prompt the user with a four-op menu 3. Return their response to this me `HaveTurn`; their response is validated to ensure that it is only er "1", "2", "3" or "4",
`GetScoreForWord` Ⓕ	Parameters: `Word` `TileDictionary` Returns: `Score` Called from: `UpdateAfterAllowedWo` Calls: -	1. Asssign the variable `Score`, the va zero 2. Loop through each character in the , adding the score for each letter (taken as read from the map) to tal 3. If the length of the word is greater tha add 20 to the score 4. If the length of the word is 6 or 7, add 5 he score 5. Return the score to `UpdateAfterAllo edWord`

`GetStartingHand` Ⓕ	Parameters: `TileQueue`
	`StartHandSize`
	Returns: `Hand`
	Called from: `PlayGame`
	Calls: `QueueOfTiles.Add`
	`QueueOfTiles.Remove`
		1. Create an empty string
		2. Loop once per tile in `startHandSize` (in al / 20 times).
		3. Add a character to the string by removing a t rom the front of the tile queue
		4. Add a tile to the back of the tile queue
		5. Return the string (Hand) to `PlayGame`

Main Program – Subroutines	Description	

`HaveTurn`Ⓕ	Parameters: `PlayerName`
	`PlayerTiles`
	`PlayerTilesPlayed`
	`PlayerScore`
	`TileDictionary`
	`TileQueue`
	`AllowedWords`
	`MaxHandSize`
	`NoEndOfTurnTiles`
	Returns: `PlayerTiles`
	`PlayerTilesPlayed`
	`PlayerScore`
	`TileQueue`
	Called from: `PlayGame`
	Calls: `DisplayTilesInHand`
	`GetChoice`
	`DisplayTileValues`
	`FillHandWithTiles`
	`CheckWordIsInTiles`
	`CheckWordIsValid`
	`UpdateAfterAllowedWord`
	`GetNewTileChoice`
	`AddEndOfTurnTiles`
	`QueueOfTiles.Show`
		1. Display which player's turn it is
		2. Display's the player's hand
		3. A loop runs prompting the player to enter option "1", "4", "7", "0" or enter a word, via a call to `GetChoice`, until they enter a word or option "0"
		4. If they enter "1", the value of all tiles are displayed by calling `DisplayTileValues`
		5. If they enter "4", the tile queue is displayed by calling `QueueOfTiles.Show`
		6. If they enter "7", redisplay the player's hand by calling `DisplayTilesInHand`
		7. If they enter "0", fill the player's hand by calling `FillHandWithTiles`
		8. If they enter none of those options, the assumption is that they have entered a word, so its length is checked
		9. If the length is 0, a variable called `ValidWord` is set to false
		10. If the word is invalid based on a call to `CheckWordIsInTiles`, `ValidWord` is set to false
		11. If the word is valid, the move is processed by calling `UpdateAfterAllowedWord` and `GetNewTileChoice`
		12. If the word is invalid, a message is displayed saying 'Not a valid attempt. You lose your turn.'
		13. New tiles are drawn by calling `AddEndOfTurnTiles` unless the player requested no tiles in the call to `GetNewTileChoice` (if the move was invalid, the player has no choice and three new tiles will be drawn)
		14. Outputs the current game state

Main Program – Subroutines	Description	

`Main` Ⓟ	Parameters: -
	Returns: -
	Called from: -
	Calls: `LoadAllowedW`
	`CreateTileDictionary`
	`DisplayMenu`
	`PlayGame`
		1. Game settings are initialised: `MaxHandSize`, `MaxTilesPlayed`, `NoOfEndOfTurnTiles`, `StartHandSize`
		2. Menu is displayed and use[illegible]mpted
		3. Loop continues until "9" is [illegible] to quit
		4. If "1" is entered, game is played with random tiles
		5. If "2" is entered, game is playe[illegible]h string literals defined in `PlayGame`

`PlayGame` Ⓟ	Parameters: `AllowedWords`
	`TileDictionary`
	`RandomStart`
	`StartHandSize`
	`MaxHandSize`
	`MaxTilesPlayed`
	`NoOfEndOfTurnTiles`
	Returns: -
	Called from: `Main`
	Calls: `GetStartingHand`
	`HaveTurn`
	`UpdateScoreWithPenalty`
	`DisplayWinner`
	`QueueOfTiles (constructor)`
		1. Set Player One score and Player [illegible]score to 50
		2. Set number of tiles (for both playe[illegible]) 0
		3. Create new tile queue containing 2[illegible]s
		4. If a random start has been requested (i[illegible]Main), hands are populated randomly
		5. Otherwise, hands are populated with s[illegible] literals
		6. Loop to run until either player has reach[illegible] the maximum number of tiles played (50) or the maximum number of tiles in hand (20)
		7. Call `HaveTurn` alternately for Player One an[illegible] Player Two until the loop terminates
		8. Update scores of both players by calling `UpdateScoreWithPenalty` for each playe[illegible]
		9. Display the winner by calling `DisplayWinner`

`UpdateAfterAllowedWord`Ⓕ	Parameters: `Word`
	`PlayerTiles`
	`PlayerScore`
	`PlayerTilesPlayed`
	`TileDictionary`
	`AllowedWords`
		1. Add the length of the word just played to the total number of tiles played
		2. Loop through each character in the played word, removing a corresponding tile from the player's hand
		3. Update the player's score by calling `GetScoreForWord`

Program Classes

The program contains one class. Its purpose is described briefly in the table below.

Class	Description
`QueueOfTiles`	Class to store the structure that c…s tiles before they are passed to a player. The structure …is a list, and an integer points to the rear of the queue. The front is al…ys element zero in the list.

Class Methods

The only class is `Queue…iles`. The functions Ⓕ and procedures Ⓟ are de…ed below.

QueueOfTiles – Methods	Description	
`__init__` Ⓕ	Parameters: `MaxSize` Returns: `QueueOfTiles` Called from: `PlayGame` Calls: `QueueOfTiles.Add`	1. Constructor method – create a new `Que…ofTiles` object when called (and return this object) 2. Create an empty list to store the queue 3. Set the attribute MaxSize to the parameter …Size 4. Set `_Rear` to -1. This variable is the pointer t… the back of the queue. Since the list is initially empty, there c…e no meaningful rear pointer. 5. Call the `Add` method repeatedly, e.g. if `MaxSize` is 20, call `Add` 20 times.
`IsEmpty` Ⓕ	Parameters: - Returns: `True or False (Boolean)` Called from: `QueueOfTiles.Remove`	1. If `rear` is -1 (meaning the pointer is not within the list, so the list can be considered empty) return true 2. For any other value of `_Rear`, return false

QueueOfTiles – Methods	Description	

`Add` Ⓟ	Parameters: -
	Returns: -
	Called from: `GetStartingHand`
	`AddEndOfTurnTiles`
	`FillHandWithTiles`
	Calls: -
		NB. This subroutine will do nothing if `_Rear` already points to the end of the list, since there would be no room to add a character.
		1. Generate a random integer from 0 to 25
		2. Increment `_Rear` by 1, indicating the queue is now one larger
		3. At the rear of the queue, add the character whose ASCII code is equal to the randomly generated integer plus 65, e.g. if it was 0, add 'A', if it was 1, add 'B', if it was '2' add 'C', etc.

`Show` Ⓟ	Parameters: - Returns: - Called from: `HaveTurn` Calls: -	*NB. This subroutine will do nothing if the queue is empty.* 1. Print a blank line 2. Print "The contents of the queue are:" followed by 3. looping through each item in the queue and printing it out 1. Print a blank line

Variables

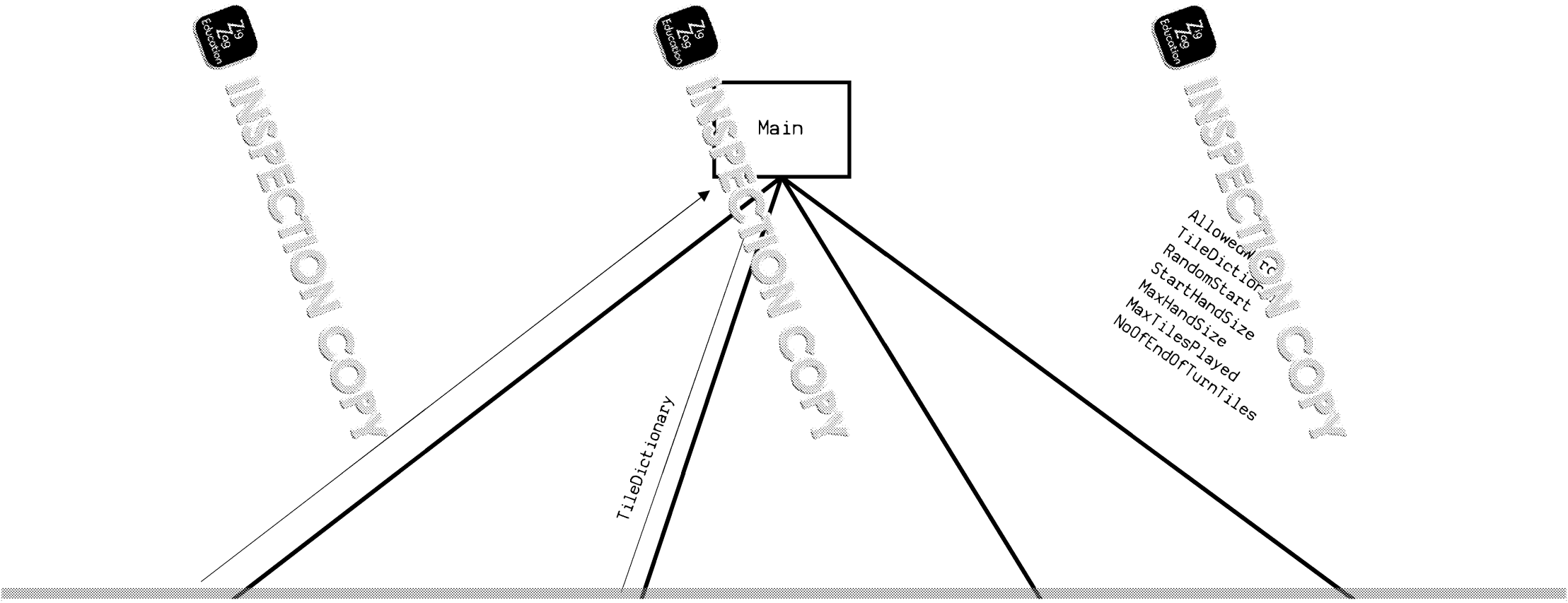
The following table contains variables that are declared locally and passed to at least one other method.

Main Program – Variables	Type	Description	Created in
`AllowedWords`	`list of strings`	Contains all valid words read from a text file	`Main` via a call to `LoadAllowedWords` subroutine
`Choice`	`String`	Contains user input at the main in-game menu, indicating whether they want random hands or the training hands (or to quit).	`Main`
`MaxHandSize`	`integer`	The largest number of tiles that a player can hold –	`Main`

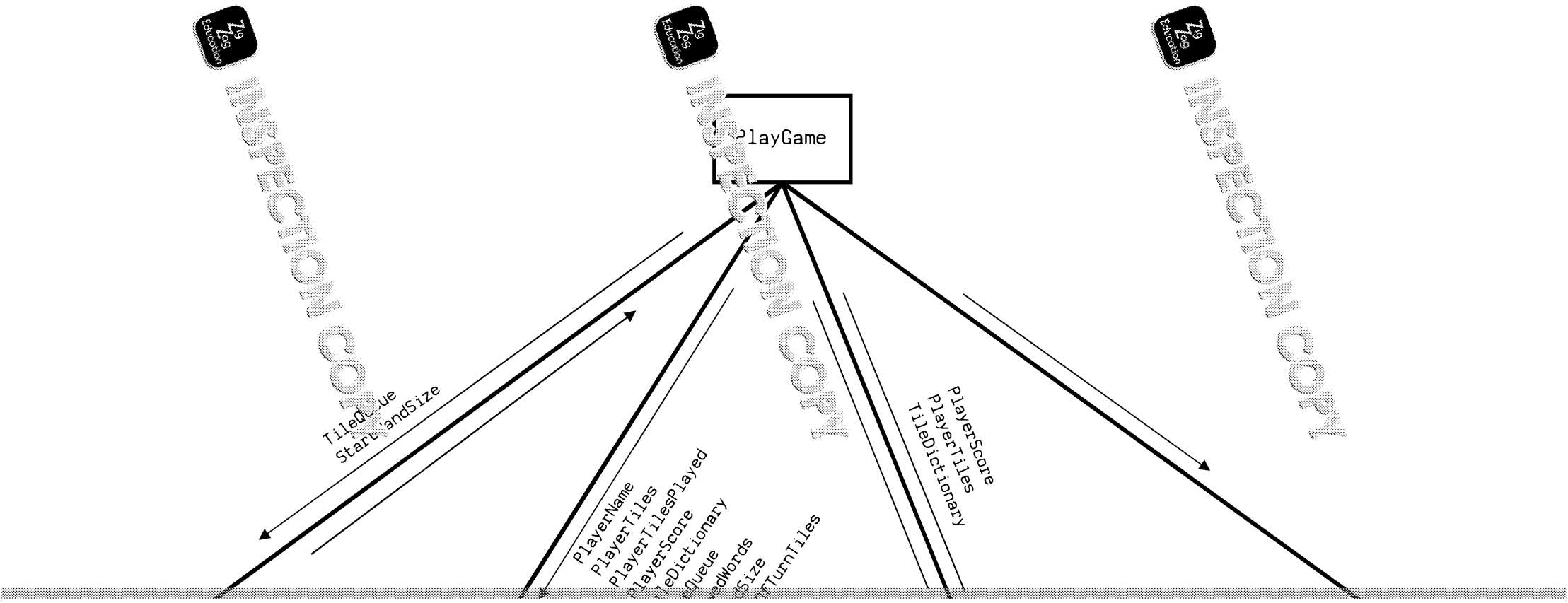
The following table contains the attributes of the `QueueOfTiles` class.

QueueOfTiles – Attributes	Type	Description	Created in
`_Contents`	`list`	List to contain all letters in the queue before they are passed to a player's hand	`__init__` (the constructor)
`_Rear`	`integer`	The index of the back of the queue, used to add new tiles to the correct location in the list	`__init__` (the constructor)
`_MaxSize`	`integer`	The largest size that the queue can be	`__init__` (the constructor)

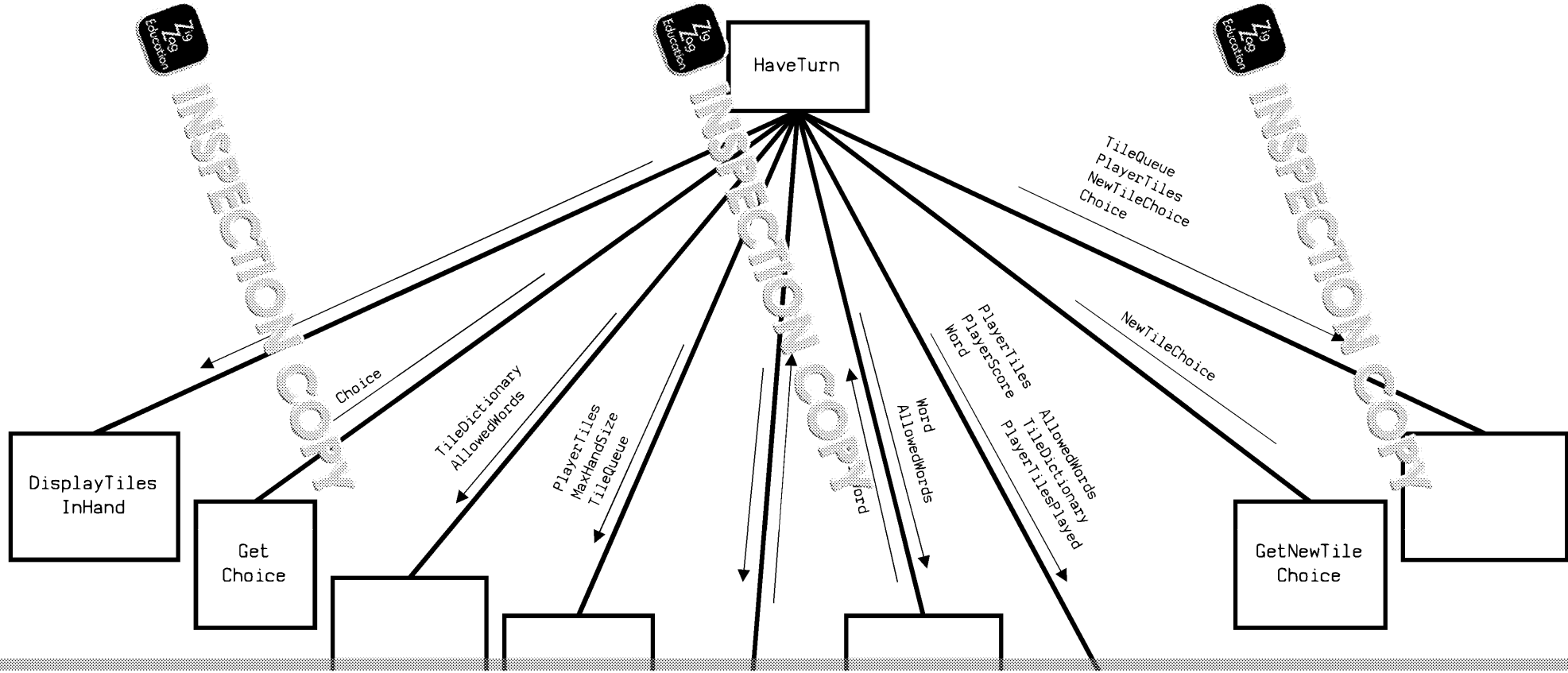
Main and subroutines called from **Main**



PlayGame and subroutines called from **PlayGame**



HaveTurn and subroutines called from **HaveTurn**



Written Questions (Python)

These questions refer to the preliminary material and require you to load the skel any additional programming.

1. State the name of an identifier for:
   a) A class [1]
   b) A variable [1]
   c) A variable that is used to store a Boolean return value [1]
   d) A parameter whose data type is dictionary [1]
   e) A function with three parameters [1]
   f) A procedure with no parameters [1]
   g) A local variable (excluding parameters) within the `HaveTurn` subro
   h) An attribute of `QueueOfTiles` [1]
2. Write one line of code from the skeleton program which calls a library subrou
3. Look at the subroutine `CreateTileDictionary`. Describe the purpose of

```
TileDictionary[chr(65 + Count)] = 1
```

4. State and describe the data structure returned by the `CreateTileDictio`
5. Look at the subroutine `CheckWordIsInTil` Explain the role of the vari
6. Describe the difference between a procedure and a function. State one exam code. Do not include any that from the class `QueueOfTiles` in your an
7. Describe what would happen if, during a call to `LoadAllowedWords`, the fi found.
8. Describe the actions performed in the following lines of the `LoadAllowed`

```
for Word in WordsFile:
    AllowedWords.append(Word.strip().upper()
```

9. The `QueueOfTiles` class contains a constructor. Describe what is meant b
10. Describe the effect of the following instruction within the `QueueOfTiles` c

```
self._MaxSize = MaxSize
```

11. Explain why the variable `_Rear` is initialised to -1 in the `QueueOfTiles` co
12. Describe in detail the purpose of the subroutine `UpdateScoreWithPenal` and/or return values in your answer. [5]
13. Describe the operation of the following code within the subroutine `GetScor`

```
Score = 0
for Count in range (len(Word)):
    Score = TileDictionary[Word[Count]]
```

14. Explain the role of the iterative structure within the subroutine `GetNewTil`
15. Explain why the variable `NewTileChoice` is initialised to the string value "2"

Written Questions (Python)

These questions refer to the preliminary material and require you to load the skel any additional programming.

1. State the name of an identifier for:

   a) A class [1]

   ....

   b) A list variable [1]

   ....

   c) A variable that is used to store a Boolean return value [1]

   ....

   d) A parameter whose data type is dictionary [1]

   ....

   e) A function with three parameters [1]

   ....

   f) A procedure with no parameters [1]

   ....

   g) A local variable (excluding parameters) within the `HaveTurn` subro

   ....

   h) An attribute of `QueueOfTiles` [1]

   ....

2. Write one line of code from the skeleton program which calls a library subrou

   ....

3. Look at the subroutine `CreateTileDictionary`. Describe the purpose of

```
TileDictionary[chr(65 + Count)] = 1
```

....

....

....

....

4. State and describe the data structure returned by the `CreateTileDictio`

5. Look at the subroutine `CheckWordIsInTiles`. Explain the role of the va

6. Describe the difference between a procedure and a function. State one exa
code. Do not include any methods from the class `QueueOfTiles` in your a

7. Describe what would happen if, during a call to `LoadAllowedWords`, the f
found. [4]

8. Describe the actions performed in the following lines of the `LoadAllowed`

```
for Word in WordsFile:
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10. Describe the effect of the following instruction within the `QueueOfTiles` c

```
self._MaxSize = MaxSize
```

11. Explain why the variable `_Rear` is initialised to -1 in the `QueueOfTiles` c

12. Describe in detail the purpose of the subroutine `UpdateScoreWithPenal` and/or return values in your answer. [5]

13. Describe the operation of the following code within the subroutine GetSco

```
Score = 0
for Count in range (len(Word)):
    Score += TileDictionary[Word[Count]]
```

14. Explain the role of the iterative structure within the subroutine GetNewTil

15. Explain why the variable NewTileChoice is initialised to the string value "2"

Programming Tasks (Python)

The following questions require you to open the skeleton program and make modi

Question 1

This question refers to `GetScoreForWord`.

Currently, the source code assigns bonus points for words that contain more than
`GetScoreForWord` so that words of two or three letters incur a one-point pena
'BAR' would normally be worth four points (B=2, A=1, R=1). Following the new ru
be applied, meaning 'BAR' would only be worth three points.

Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `GetScoreForWord`
- One screen capture showing the word played, the new score and the tota
  sequence of events:
  - Begin the game with the training hand
  - On *Player One*'s first turn, play the wo[illegible]AL
  - Press '4' to request no new tiles
- One screen capture showing [illegible] played, the new score and the tota
  sequence of events:
  - Begi[illegible]me again with the training hand
  - [illegible]*yer One*'s first turn, play the word 'BARS'
  - [illegible]ess '4' to request no new tiles

Question 2

This question refers to `DisplayTilesInHand` and `HaveTurn`.

The program currently displays the letters in the player's hand as a single string
`DisplayTilesInHand` so that an **additional** line is printed out in which each l
its points value in brackets, followed by a space; for example:

`A(1) F(3) M(2) E(1)` etc.

Modify `HaveTurn` to allow `DisplayTilesInH[illegible]` to have access to the point

Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `DisplayTilesInHand`
- Your amended SOURCE CODE PROGRAM for `HaveTurn`
- One screen capture showing *Player One*'s hand at the beginning of the ga
  hand

Question 3

This question refers to `CreateTileDictionary`.

Currently, there are no letters worth four points. Modify the code in `CreateTi` letters 'K', 'V' and 'Y' are each worth four points.

Evidence you need to provide:

- Your amended SOURCE CODE P... for `CreateTileDictionary`
- One screen capture sh... no... letter values after any player's turn

Question

This question relates to `PlayGame` and `DisplayWinner`.

'Words With AQA' is currently a two-player game. Add code to `PlayGame` to incl should be assigned the same values as *Player One* and *Player Two*. The call to `Di` an additional parameter, and, if *Player Three* has the highest score, they should b

The training hand for *Player Three* should be 'ABCDEFGHIJKLMNO'.

When displaying the winner, the output should be 'Player One wins!', 'Player Tw 'No clear winner'. This last message should be displayed if any two players are t

Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `PlayGame`
- Your amended SOURCE CODE PROGRAM for `DisplayWinner`
- One screen capture showing ...'s turn and the prompt that marks turn (the action take... *Player Two* is unimportant). Begin with the train

Question

This question refers to `HaveTurn`.

Presently, if a valid word is played, the program displays the text 'valid word'. M followed, on the same line, with the word and its score. If the player has played points, the output should be as follows:

Valid word. FARM scores 7 points.

Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `HaveTurn`
- One screen capture showing *Player One*'s first ... with the training hand ABANDON

Question 6

This question refers to a new class, `Player`.

The program does not currently allow efficient creation of additional players. Th
creation of a class called `Player`.

Create a `Player` class that contains private attrib[illegible] to store that player's tiles
they have played. There should be a constr[illegible]or to initialise these attributes to
`PlayGame`. In order to do this, a [illegible]`Tiles` object called `TileQueue` wi
for the constructor.

Create acc[illegible]et[illegible]ds within the class to grant public visibility to each of the

Evidence you need to provide:

- The SOURCE CODE for a new class, `Player`

Question 7

This question refers to `GetChoice` and `HaveTurn`.

Currently, there is no option for the player to swap their letters. Extend the men
option 'Press 2 to swap all your letters OR'. Modify `HaveTurn` so that all tiles in
and are replaced by an equivalent number of letters from the tile queue. There s
tiles) for changing letters.

Once the letters have been swapped, the new ha[illegible] be displayed, but play
player.

Evidence you need to pr[illegible]:

- Yo[illegible]nd [illegible]OURCE CODE PROGRAM for `GetChoice`
- You[illegible]ded SOURCE CODE PROGRAM for `HaveTurn`
- One screen capture showing *Player One*'s hand both before and after sele
'before' hand should be the training hand.

Question 8

This question refers to `Add` within the `QueueOfTiles` class.

Modify this subroutine to prevent two indentical consecutive letters being added
be used to cause new letters to be generated (and ignored) until a letter is gener
previous letter. At that point, the letter should be added to the queue.

Evidence you need to provide:

- Your amended SOURCE CODE [illegible]M for `Add`

Question 9

This question refers to `LoadAllowedWords`.

Currently, all words are taken from the `aqawords.txt` file. Modify the `LoadA` that the following takes place:

1. The user is asked to press option '1' for the default dictionary or '2' for a c be validation for this input.
2. If the user presses '1', the `aqawords.txt` file is used as normal.
3. If the user presses '2' they are prompted for the name of a file. The prog the specified file name, and this will be used instead of `aqawords.txt`.
4. If the user enters a file name that cannot be found then the program will inste

You should **only** modify `LoadAllowedWords` in your response to this question.

Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `LoadAllowedWords`
- One screen capture showing the menu (press '1' for default, press '2' for c program's response to '2' being entered.

Question 10

This question refers to `Main`.

The program currently attempts to load words from a text file called `aqawords` or not found, the game is allowed to carry on. Under these circumstances, howe the game effectively cannot be played.

Modify the main subroutine so that if `LoadAllowedWords` returns an empty li time error with the message "Dictionary file not found", before terminating.

Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `Main`
- One screen capture showing the entire starting output of the program. P should change `aqawords.txt` in the `LoadAllowedWords` subroutine

Question 11

This question refers to `HaveTurn`.

The program currently displays a player's hand, but does not display how many le
makes the decision of how many tiles to draw more difficult than it needs to be.

Modify `HaveTurn` so that both before and after new ti are drawn, the numbe
displayed. If no new tiles are drawn, the me g should only be displayed once
decision not to draw any new tile at should consist of the following fo

```
You have XX til      aining.
```

Evidence yo to provide:

- Your amended SOURCE CODE PROGRAM for `HaveTurn`
- One screen capture showing the output having done the following:
  - Selected '2' to play with the training hand
  - Played the word BAT for *Player One*
  - Pressed '3' to indicate that you want to replace the tiles played p
- One screen capture showing the output having done the following:
  - Selected '2' to play with the training hand
  - Played the word HAND for *Player One*
  - Pressed '4' to indicate that you want no replacement tiles

Question 12

This question refers to a new class, `LetterTil`

The program currently uses char ter to represent tiles, with the value of each l
structure. An alternativ would be to create a new class, from which objects coul
representin e.

Create a new class called `LetterTile`. It should be assembled according to th

- There should be three attributes – `_Letter` (string), `_Score` (integer) a
  last attribute would be set to '`True`' for a vowel (A, E, I, O, U) and '`Fals`
- The constructor should have two parameters – the letter and the diction
  letter. The constructor should set all three attributes correctly. For exam
  attributes would be set as follows:
  - `_Letter`: A (the letter should always be stored in the attribute i
  - `_Score`: 1 (since 'A' is worth a single point)
  - `_IsVowel`: `True`' (since 'A' is a vowel)
- There should be a public accessor method to grant access to each attribu

Evidence you need to provide:

- The SOURCE CODE for a new cla t ile.

Question 13

This question refers to `Main` and `DisplayMenu`.

Presently, the values of `MaxHandSize`, `MaxTilesPlayed`, `NoOfEndOfTurnT` written into the code and cannot be changed by the user.

- Add a menu option in `DisplayMenu` to re... ...ettings'.
- Alter the code in `Main` so that if 'Z' ... ...hosen from the menu, the user w... following prompts in turn:
  - Enter ma... ...d size:
  - Ent... ...mum tiles played:
  - ...ter default new tiles:
  - Enter starting hand size:
- The user input (which will not need to be validated) should go into the v... `MaxTilesPlayed`, `NoOfEndOfTurnTiles` and `StartHandSize` res...

Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `DisplayMenu`
- Your amended SOURCE CODE PROGRAM for `Main`
- One screen capture showing the following:
  - Option 3 is chosen from the first menu
  - Set maximum hand size to 25
  - Set maximum tiles played to 40
  - Set default new tiles to 2
  - Set starting hand size to 10
  - Begin the game with a random start ...

Question 14

This questi... ...s to the `QueueOfTiles` class.

Presently, letters are chosen purely at random, which can result in a queue and a... sufficient number of vowels.

Modify the add subroutine and any other necessary code so that letters are selec... order:

- The first letter is chosen purely at random, as is currently the case
- The second letter is also chosen at random
- The third letter is chosen at random from the vowels only (A, E, I, O, U)
- Every letter that is chosen other than the first two and every third letter is ...
- Every third letter should be a randomly chosen vowel (A, E, I , O, U)

It may help you to know that the ASCII values for th... ...ls are as follows: A=65...

Evidence you need to provide:

- Your amended S... ...E PROGRAM for the `QueueOfTiles` class
- One ... ...owing *Player One*'s tiles after choosing to play with a ...

Question 15

This question refers to `HaveTurn` and a new subroutine called `ResolveBlank`

The game is currently played without blank tiles. In other games, such as Scrab
part of a word. That blank tile can count for any letter as long as it results in the

Create a new subroutine called `ResolveBlanks`. This subroutine should beha

- It accepts a single variable which is a string that may or may not
play the role of blank
- For each dash entered, the user is given the prompt 'Enter value of
ide for all instances of dash in the word)
- The inputs a character, which replaces a dash (in the event of multip
should be replaced in the order in which they appear). No validation is
- The word, now without any dashes, is returned to `HaveTurn`

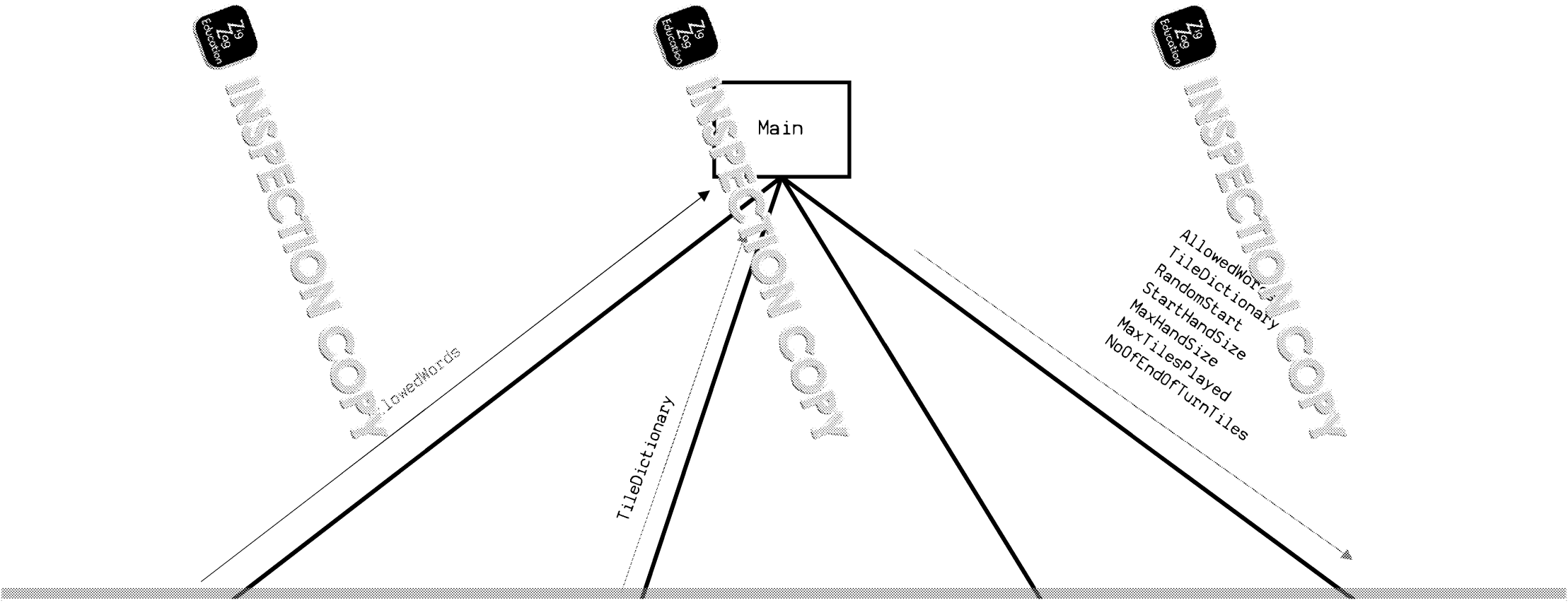
You should also modify `HaveTurn` so that `ResolveBlanks` is called immediat
`CheckWordIsValid` is called.

You should also add the "-" tile to `TileDictionary` and assign it a value of 0

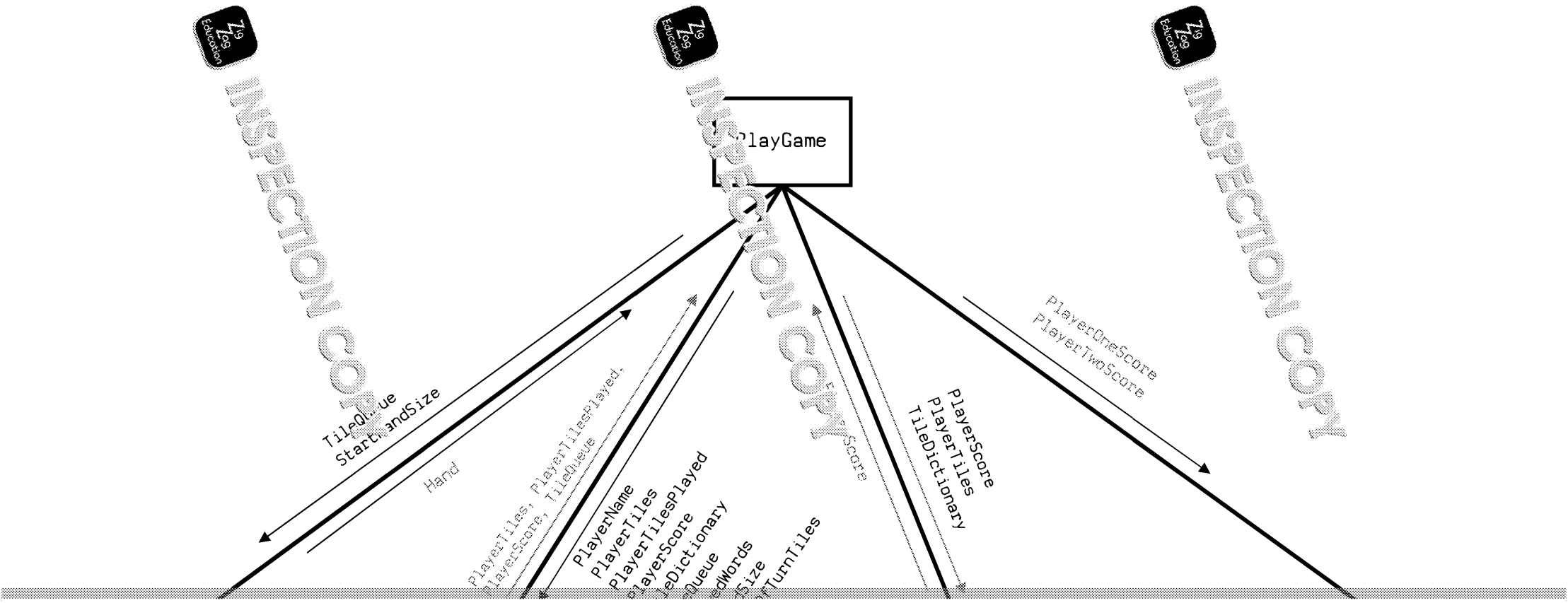
Evidence you need to provide:

- Your amended SOURCE CODE PROGRAM for `HaveTurn`
- Your SOURCE CODE PROGRAM for the new `ResolveBlanks` subroutine
- One screenshot showing the output that results from the following:
  - Before running the program, change the following line in the `Pl`
    - FROM: `PlayerOneTil = "TAHANDENONSARJ"`
    - TO: `PlayerOneTil = "--AHANDENONSARJ"`
    (i.e. change the two characters to dashes)
  - Run the program and select the training hand option
  - Play the following: han--
  - At the first prompt, enter `D`
  - At the second prompt, enter `Y`
- One screenshot showing the output that results from the following:
  - Run the program and select the training hand option
  - Play the following: ha---

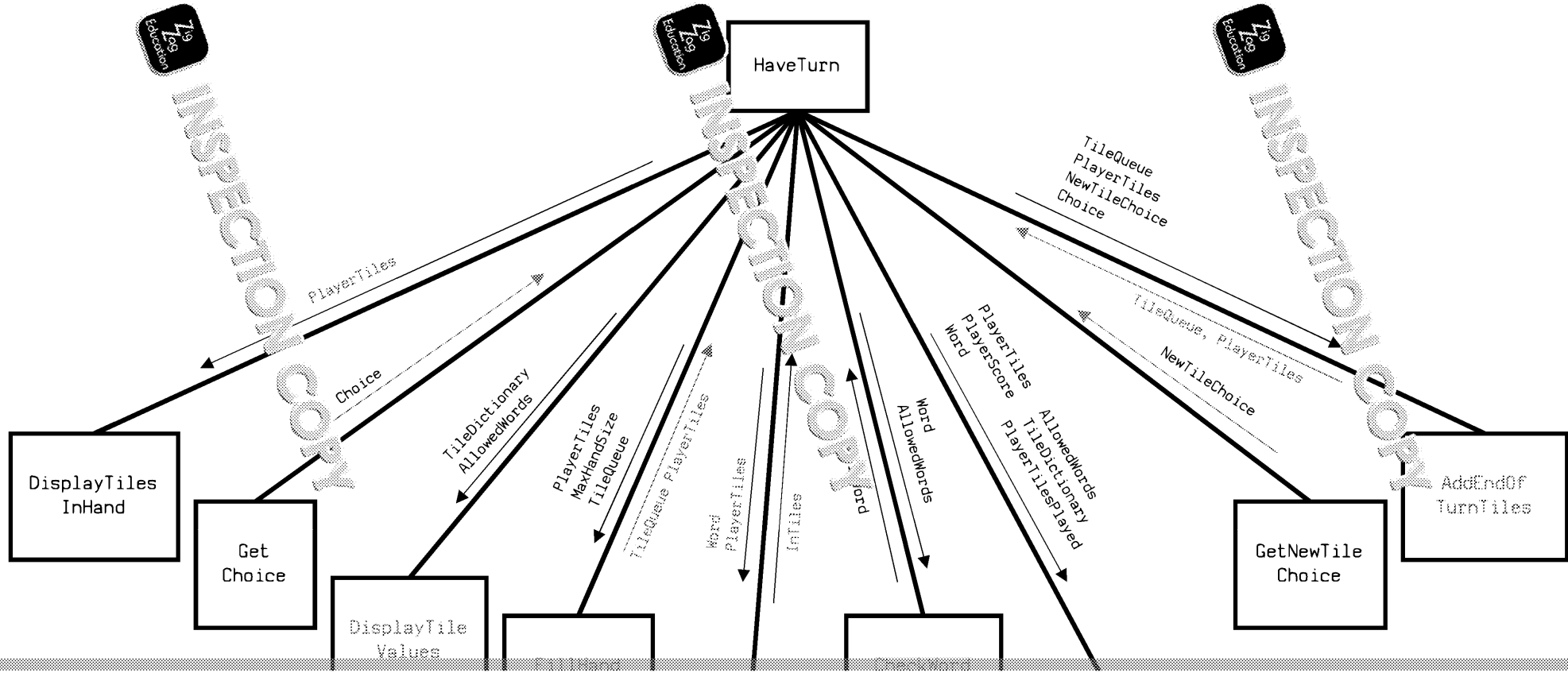
Main and subroutines called from **Main**

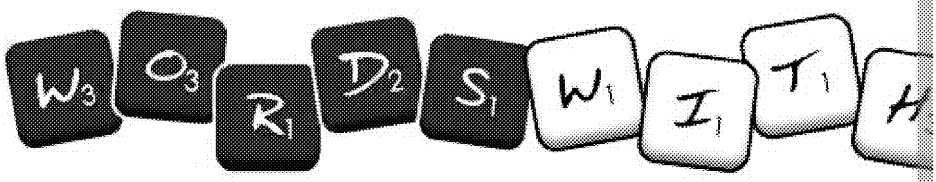


PlayGame and subroutines called from **PlayGame**



HaveTurn and subroutines called from **HaveTurn**



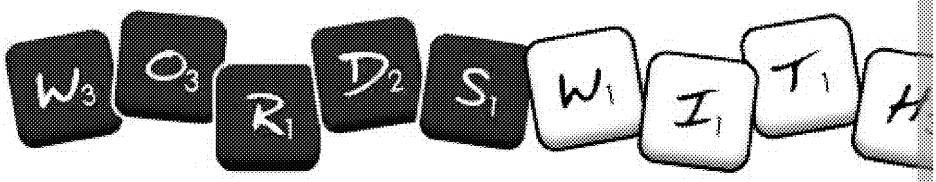


Written Questions:
Suggested Answers and Mark Schem

Q	Answer/Guidance
1a	`QueueOfTiles`
1b	`_Contents / AllowedWords`
1c	`InTiles / ValidWord`
1d	`TileDictionary`
1e	`FillHandWithTiles / UpdateScoreWithPenalty`
1f	`DisplayMenu / Main`
1g	`NewTileChoice / ValidChoice / ValidWord / Choice`
1h	`_Contents / _Rear / _MaxSize`
2	The whole line must be included for the mark: • `RandNo = random.randint(0, 25)`
3	1 mark for each point: • Adds (an entry) to the dictionary • Entry is the character with ASCII value of 65 + 'count' • Entry includes integer value '1'
4	1 mark for stating data structure: • Dictionary Up to 3 marks for description: • Contains unique keys • Keys are letters of the alphabet • Each key links to another value • Other value is an integer / the score for that letter Also accept key-value pairs for 2 marks (3rd mark for describing key as a letter o
5	Up to 2 marks for explanation: • Creates a copy of the player's tiles • Characters are eliminated from the copy • Prevents tiles being eliminated from the tiles (since word has not

Q	Answer/Guidance
6	2 marks for difference between procedure and function: • A *procedure* performs a sequence of events but *does not* return a value • A *function* also performs a sequence of events but *does* return a value Sufficient for 2 marks: a function returns a value – a procedure does not 1 mark for identifying a procedure: • `DisplayMenu` • `DisplayTilesIn[illegible]` • `Display[illegible]` • `[illegible]pi[illegible]ner` • [illegible] • `PlayGame` 1 mark for identifying a function: • `CheckWordIsInTiles` • `CheckWordIsValid` • `CreateTileDictionary` • `FillHandWithTiles` • `GetChoice` • `GetNewTileChoice` • `GetScoreForWord` • `HaveTurn` • `GetStartingHand` • `LoadAllowedWords` • `UpdateAfterAllowedWord` • `UpdateScoreWithPenalty`
7	1 mark each up to 4 marks: • An exception would [illegible] • Execution [illegible] the 'except' block • [illegible] populate the AllowedWords list would not be executed • [illegible]except' block contains no code/instructions • [illegible]empty list would be returned
8	1 mark each up to 4 marks: • Goes through the file one line at a time • Assigning the contents of each line to the variable Word • The Word/line is stripped of any trailing spaces and end of line charac[illegible] • The Word/variable is converted to upper case • And appended to the list AllowedWords (or list of allowed words)
9	1 mark for each up to 2 marks: • A constructor is a method called by creating a variable using the class [illegible] Class() • Creates a new object based on the class in which it resides • Constructor method is called __init__ • Ensures that a new object in the clas[illegible]it [illegible]sed correctly
10	2 marks: • Sets the instance variable (_MaxSize) • [illegible] to the [illegible]te (MaxSize)
11	2 mar[illegible] • [illegible]ear points to the back of the queue • Value of -1 indicates an empty queue • -1 is a rogue/special value

Q	Answer/Guidance
12	1 mark for parameters: • Player's current score, tiles in the player's hand, `TileDictionary` th 1 mark for return value • Player's updated score Up to 3 marks from the following: • Purpose of function is to subtra al player's tiles/hand from the • Loop is established to ugh each tile/character in the playe • Value of each ined by looking up in a dictionary • V ted from player's score
13	4 mar • core/integer/variable is set to zero • Loop iterates through each character in the word • Value of character looked up in the (Tile)Dictionary • Value added to score
14	2 marks • Loop continues until user has selected '1', '2', '3' or '4' • Validates user input
15	3 marks • Contents of this variable are passed to `AddEndOfTurnTiles` • Selection of '2' indicates that three new tiles will be drawn • The only way to replace this selection is to have played a valid word
TOTAL MARKS	



Programming Tasks: Suggested Solutions and Mark Schem

That the ... recommended solutions, and not an exhaustive list of all possible so... guidance ... be used as a guide only. Discretion should be used in awarding credit wh...

Question 1

1 mark An IF statement that evaluates to TRUE for a word length of either two

1 mark The IF statement evaluates to TRUE for a word length of two or three l

1 mark Score decremented correctly within the IF statement

```
elif len(Word) in [2,3]:
  Score -= 1
```

1 mark Screenshot shows 'HAD' was played, the ... l is '55' and the total ...

```
Your word was: HAD
Your new score is: 55
You have played 3 tiles so far in this
```

1 mark Screenshot shows 'BARS' was played, the new total is '55' and the total ...

```
Your word was: BARS
Your new score is: 55
You have played 4 tiles so far in this
```

Question 2

1 mark `DisplayTilesInHand` uses additional parameter containing the Til
means has been used to grant access to the dictionary, but marks 6 and
not be available)

1 mark Loop to iterate through each character in the p' s hand

1 mark Display the character

1 mark Display the value of letter taken from the `TileDictionary`

1 mark C for string, to include brackets and a single space after each clo

```
def DisplayTilesInHand(PlayerTiles, TileDict
  print("\nYour current hand: " + PlayerTile
  print("With values: ", end="")
  for letter in PlayerTiles:
    print(letter+" ("+str(TileDictionary[let
  print()
```

1 mark Initial call for player's hand from `HaveTurn` uses new argument correct

```
DisplayTilesInHand(PlayerTiles, TileDict
```

1 mark Second call for player's hand fr `eTurn` uses new argument corre

```
elif Choice == "/":
    splayTilesInHand(PlayerTiles, TileDi
```

1 mark Screenshot showing correct output format, which should also include t

```
Your current hand: BTAHANDENONSARJ
With values: B (2) T (1) A (1) H (3) A (1) N (1) D (2) E (1) N (1) O (
```

Question 3

1 mark Removal of values 10, 21 and 24 from the selection structure that assig

1 mark Inclusion of values 10, 21 and 24 in a new selection structure

1 mark These values, and only these values, assigned a score of 4

```
elif Count in [5, 7, 2?]:
  TileDictionary[chr(65 + Count)] = 3
elif Count in [10, 21, 24]:
  TileDictionary[chr(65 + Count)] = 4
```

1 mark Screenshot shows that K, V and Y are worth four points each

```
TILE VALUES

Points for A: 1
Points for B: 2
Points for C: 2
Points for D: 2
Points for E: 1
Points for F: 3
Points for G: 2
Points for H: 3
Points for I: 1
Points for J: 5
Points for K: 4
Points for L: 2
Points for M: 2
Points for N: 1
Points for O: 1
Points for P: 2
Points for Q: 5
Points for R: 1
Points for S: 1
Points for T: 1
Points for U: 2
Points for V: 4
Points for W: 3
Points for X: 5
Points for Y: 4
Points for Z: 5
```

Question 4

1 mark Adding a score for *Player Three*

```
PlayerThreeScore = 50
```

1 mark Adding a tile count for *Player Three* and setting to zero

```
PlayerThreeTilesPlayed = 0
```

1 mark *Player Three*'s hand filled with random tiles

```
if RandomStart:
    PlayerOneTiles = GetStartingHand(TileQueu
    PlayerTwoTiles = GetStartingHand(TileQueu
    PlayerThreeTiles = GetStartingHand(TileQu
```

1 mark *Player Three*'s hand filled with tiles of letters A–O in the 'else' block

```
else:
    PlayerOneTiles = "BTAHANDENONSARJ"
    PlayerTwoTiles = "CELZXIOTNESMUAA"
    PlayerThreeTiles = "ABCDEFGHIJKLMNO"
```

1 mark Logic expression in 'while' loop includes tiles played for *Player Three*

1 mark Logic expression includes check for size of hand and all logic is sound

```
while PlayerOneTilesPlayed <= MaxTilesPlayed and PlayerTwoTilesPlayed <= MaxTilesPlayed and Play
    and len(PlayerOneTiles) < MaxHandSize and len(PlayerTwoTiles) < MaxHandSize and len(Player
```

1 mark Call to `HaveTurn` with variables for tiles, tiles played and score for *Pl*

```
HaveTurn("Player Three", PlayerThreeTiles, PlayerThreeTilesPlayed, PlayerThreeScore, TileDictionary, TileQueue, A
```

1 mark Call to `UpdateScoreWithPenalty` for *Player Three*

```
PlayerThreeScore = UpdateScoreWithPenalty(PlayerThreeScore, Player
```

1 mark Call to `DisplayWinner` passes scores for all three players

```
DisplayWinner(PlayerOneScore, PlayerTwoScore
```

1 mark Subroutine `DisplayWinner` has three parameters instead of two

1 mark Score for *Player Three* is displayed

```
def DisplayWinner(PlayerOneScore, PlayerTwoScore, PlayerThre
    print()
    print("**** GAME OVER! ****")
    print()
    print("Player One your score is", PlayerOneScore)
    print("Player Two your score is", PlayerTwoScore)
    print("Player Three your score is", PlayerThreeScore)
```

1 mark Correct logic for displaying 'Player One wins!'

1 mark Correct logic for displaying 'Player Two wins!'

1 mark Correct logic for displaying 'Player Three wins!'

1 mark 'No clear winner' displayed in 'else' block (**A:** if this has been written as covers all other combinations; **R:** if other text is displayed)

```
if PlayerOneScore > max([PlayerTwoScore, P
  print("Player One wins!")
elif PlayerTwoScore > max([PlayerOneScore,
  print("Player Two wins!")
elif PlayerThreeScore > max([PlayerOneScor
  print("Player Three wins!")
else:
  print("No clear winner!")
print()
```

1 mark Prompt for *Player Three* to move after *Player Two* has moved with *Player* (ABCDEFGHIJKLMNO)

```
Player Two it is your turn.

Your current hand: CELZXIOTNESMUAA

Either:
     enter the word you would like to play OR
     press 1 to display the letter values OR
     press 6 to view the tile queue OR
     press 7 to view your tiles again OR
     press 0 to fill hand and stop the game.
>plague


Not a valid attempt, you lose your turn.


Your word was: PLAGUE
Your new score is: 50
You have played 0 tiles so far in this game.

Press Enter to continue


Player Three it is your turn.

Your current hand: ABCDEFGHIJKLMNO
```

Question 5

1 mark Use of a variable to store the score for the word (**A:** if no variable is use
`GetScoreForWord` forms part of the string concatenation to display '
14 points.')

1 mark Call to `GetScoreForWord` to either initialise a variable or place the
concatenated string

1 mark Correct parameters – `ChosenWord, ScrabbleDictionary`

1 mark Concatenation incorporates all components stated in the question, incl
(**A:** full stop is not included, difference in case). Concatenation mus
the variable used to store the score (if a variable was used).

```
if ValidWord:
  print()
  print("Valid word. " + Choice + " scores " + str(GetScor
  print()
```

1 mark Input of word 'abandon' displays score worth 14 points (**DPT:** spacing e

```
Valid word. ABANDON scores 14

Do you want to:
      replace the tiles you used (1) OR
      get three extra tiles (2) OR
      replace the tiles you used and get thre
      get three new tiles (4)?
```

Question 6

1 mark Class declaration (**R:** if name or case incorrect)

```
class Player:
```

1 mark Attributes declared with appropriate names (accept alternative names if mea

1 mark All three attributes initialised to the correct type of data (**R:** if any additi attributes only declared (first used) inside the constructor)

```
_Score = 0
_NumberOfTiles = 0
_Tiles = ""
```

1 mark Constructor declared with single parameter (in addition to `self`) `Tile`

1 mark `_Score` and `_NumberOfTiles` (or their equivalents) initialised to `50` initialising `_Score` and `_NumberOfTiles` if there were initialised w

1 mark `_Tiles` (or its equivalent) initialised using a call to `GetStartingHa`

1 mark `GetStartingHand` contains correct parameters (**A: positive** integers

```
def __init__(self, TileQueue):
  self._Score = 50
  self._NumberOfTiles = 0
  self._Tiles = GetStartingHand(TileQueue, 15)
```

1 mark Accessor methods (get and set) for _Score

```
def GetScore(self):
  return self._Score

def SetScore(self, score):
  self._Score = score
```

1 mark Accessor methods (get and set) for _NumberOfTiles

```
def GetNumberOfTiles(self):
  return self._NumberOfTiles

def SetNumberOfTiles(self, NumberOfTiles):
  self._NumberOfTiles = NumberOfTiles
```

1 mark Accessor methods (get and set) for _Tiles

```
def GetTiles(self):
  return self._Tiles

def SetTiles(self, Tiles):
  self._Tiles = tiles
```

Question 7

1 mark Addition of the extra option in `GetChoice`

```
def GetChoice():
  print()
  print("Either:")
  print("     enter the word you would like to play OR")
  print("     press 1 to display the letter values OR")
  print("     press 2 to swap all your letters OR")
  print("     press 4 to view the tile queue OR")
  print("     press 7 to view your tiles again OR")
  print("     press 0 to fill hand and stop the game.")
```

1 mark Inclusion of 'elif' clause to deal with 'choice' being '2'

1 mark Variable to temporarily store the new letters (**A:** valid repurposing of `P`

1 mark Loop that runs once per letter in the original hand

1 mark Calling `Remove` and appending the character to the player's hand

1 mark Calling `Add` to keep the tile queue full

1 mark `PlayerTiles` contains the new letters

1 mark `ValidChoice` set to 'true' to prevent the main loop in `HaveTurn` rep

1 mark `NewTileChoice` set to '4' to ensure that no new tiles are taken on to

1 mark Output of new hand

```
elif Choice == "2":
  NewPlayerTiles = ""
  for ReplaceTile in PlayerTiles:
    NewPlayerTiles = NewPlayerTiles + TileQueue.Remove()
    TileQueue.Add()
  PlayerTiles = NewPlayerTiles
  ValidChoice = True
  NewTileChoice = "4"
  print("Your new hand:", PlayerTiles)
```

1 mark Output to show the original hand, selection of '2' from the menu and th comprise random letters)

```
==========
MAIN MENU
==========

1. Play game with random start hand
2. Play game with training start hand
9. Quit

Enter your choice: 2

Player One it is your turn.

Your current hand: BTAHANDFMC

Either:
     enter the word you would like to play OR
     press 1 to display the letter values OR
     press 2 to swap all your letters OR
     press 4 to view the tile queue OR
     press 7 to view your tiles again OR
     press 0 to fill hand and stop the game.
>2

Your new hand: WKQRXKBNUQKPFZA

Press Enter to continue
```

Question 8

1 mark Suitable iterative structure used

1 mark Generation of a new letter exists inside the loop

1 mark Termination of loop depends on correctly choosing a letter that is not i
that was added to the queue

1 mark Incrementation of '_Rear' inside the loop

1 mark New letter is correctly added to the rear of the queue

```
def Add(self):
  if self._Rear < self._MaxSize - 1:
    RandNo = random.randint(0, 25)
    while self._Contents[self._Rear] ==
      RandNo = random.randint(0, 25)
    self._Rear += 1
    self._Contents[self._Rear] = chr(65
```

Question 9

1 mark Options displayed to user

1 mark Declaration of variable to store input from this menu

1 mark Input assigned to variable

1 mark Declaration of variable to store file name

1 mark A choice of '1' on the previous menu will cause `aqawords.txt` to be l

1 mark A [illegible] o[illegible]ults in the user being prompted for a file name

1 mark Response of other than "1" or "2" results in them being asked to choose

1 mark String '.txt' appended to the user input file

1 mark Failure to open the file that they chose results in the `aqawords.txt` f

```
def LoadAllowedWords():
  AQAfile = "aqawords.txt"
  AllowedWords = []
  print()
  print("1: Default Dictionary")
  print("2: Custom Dictionary")
  Answer = input("> ")
  while Answer not in ["1","2"]:
    Answer = input("Please choose either 1 or 2: ")
  if Answer == "1":
    FileName = AQAfile
  else:
    FileName = input("Please enter the file name (without t
    WordsFile = open(FileName, "r")
  except:
    print("File not found:",FileName,"- using default inste
    WordsFile = open(AQAfile, "r")
  try:
    for Word in WordsFile:
      AllowedWords.append(Word.strip().upper())
    WordsFile.close()
  except:
    pass
  return AllowedWords
```

1 mark Output shows the new menu, selection of '2' and prompting for the file

```
1: Default Dictionary
2: Custom Dictionary
> 2
Please enter the file name (without the .txt): testwords
```

Question 10

1 mark 'if' clause after call to `LoadAllowedWords`

1 mark 'if' clause compares list length correctly, i.e. == 0 or <1

1 mark Suitable output message

1 mark Exception correctly raised (and of the correct type)

```
if len(AllowedWords) == 0:
    raise RuntimeError("Dictionary file not found")
```

1 mark Output displays welcome message followed by 'Dictionary file not found' and has ended

```
++++++++++++++++++++++++++++++++++++++
+ Welcome to the WORDS WITH AQA game +
++++++++++++++++++++++++++++++++++++++


Traceback (most recent call last):
  File "/Users/appler/Documents/ZigZag/AQA prelim 2017-18/Python
/Python3 Q10.py", line 288, in <module>
    Main()
  File "/Users/appler/Documents/ZigZag/AQA prelim 2017-18/Python
/Python3 Q10.py", line 272, in Main
    raise RuntimeError("Dictionary file not found")
RuntimeError: Dictionary file not found
>>>
```

Question 11

1 mark Message correctly placed (even if message is incorrect) before call to G

```
PlayerTiles, PlayerScore, PlayerTilesPlayed = UpdateAfter
print("You have",len(PlayerTiles),"tiles remaining.")
NewTileChoice = GetNewTileChoice()
```

1 mark Message correctly placed (even if message is incorrect) immediately aft
AddEndOfTurnTiles(). If is added outside the 'if' clause, but
clause to prev message being redisplayed in the event that no

1 mark S ncatenation to display message in the specified format in both

```
if NewTileChoice != "4":
  TileQueue, PlayerTiles = AddEndOfTurnTiles(TileQueue, I
  print("You have",len(PlayerTiles),"tiles remaining.")
```

1 mark Output showing 12 tiles before the draw and 18 afterwards

```
Valid word

You have 12 tiles remaining.
Do you want to:
     replace the tiles you used (1) OR
     get three extra tiles (2) OR
     replace the tiles you used and get three extra tiles (3)
     get no new tiles (4)?
>3
You have 18 tiles remaining

Your word was:
Your new
Y      played 3 tiles so far in this game.

Press Enter to continue
```

1 mark Output showing 11 tiles before the draw, then not displaying the mess
be 'Your word was: HAND'

```
Valid word

You have 11 tiles remaining.
Do you want to:
     replace the tiles you used (1) OR
     get three extra tiles (2) OR
     replace the tiles you used and get three extra tiles (3)
     get no new tiles (4)?
>4

Your word was: HA
Your new
Y      played 4 tiles so far in this game.

Press Enter to continue
```

Question 12

1 mark Class declaration (**R:** if name or case incorrect)

1 mark Attributes declared with appropriate names (**R:** if any other names are u

1 mark Constructor has a parameter for the letter (**A:** if named other than 'Lett

1 mark Constructor has a parameter for the dictionary (**A:** if named other than '

1 mark `_Letter` attribute set using letter parameter

1 mark Attribute always contains upper-case version of character

1 mark `_Score` attribute set by extracting a value from the dictionary (even if v incorrect)

1 mark Selection to isolate either vowels or consonants (even if it would not w

1 mark Selection would always isolate vowels/consonants, bearing in mind tha upper case or lower case

1 mark `_isVowel` attribute set correctly

```
class LetterTile:
  _Letter = "" # a single character string containing the
  _Score = 0 # the score value for the letter
  _IsVowel = False # True if the letter is A, E, I O or U

  def __init__(self, Letter, TileDictionary):
    self._Letter = Letter.upper()
    self._Score = TileDictionary[Letter]
    self._IsVowel = self._Letter in ["A","E","I","O","U"]
```

1 mark Accessor methods with appropriate names (**A:** any reasonable/sensible

```
def GetLetter(self):
  return _Letter

def GetScore(self):
  return _Score

def IsVowel(self):
  return _IsVowel
```

Question 13

1 mark New entry in `DisplayMenu`

```
print("2. Play game with training start hand")
print("3. Settings")
print("9. Quit")
```

1 mark 'elif' added to main to detect entry of '3'

1 mark Prompts for all four new inputs (K: alternative wording) (A: doing this e separate function)

```
choice == "3":
handSize, MaxTilesPlayed, NoOfEndOfTurnTiles, StartHandSi
```

1 mark Attempt (even if unsuccessful) to convert inputs to integers

1 mark Syntactically valid string → integer conversion for all inputs

1 mark Input prompts relate correctly to all four variables

```
def GetSettings():
  MaxHandSize = int(input("Enter maximum hand size: "))
  MaxTilesPlayed = int(input("Enter maximum tiles played
  NoOfEndOfTurnTiles = int(input("Enter default new tile
  StartHandSize = int(input("Enter starting hand size: ")
  return MaxHandSize, MaxTilesPlayed, NoOfEndOfTurnTiles,
```

1 mark Output showing values 25, 40, 2 and 10 entered, with 10 indicating the hand should now be 10 characters long instead of 15

```
MAIN MENU

1. Play game with random start hand
2. Play game with training start hand
3. Settings
9. Quit

Enter your choice: 3
Enter maximum hand size: 25
Enter maximum tiles played: 40
Enter default new tiles: 2
Enter starting hand size: 10

MAIN MENU

1. Play game with random start hand
2. Play game with training start hand
3. Settings
9. Quit
Enter your choice: 1

Player One it is your turn.

Your current hand: TMWPVBXCOV
```

Question 14

1 mark Variable to track the iterations so that a vowel is guaranteed every third

```
_NumTilesAdded = 0
```

1 mark `_Rear` is still incremented before any letter is added

1 mark Selection structure to determine whether to add a vowel or a random letter every third time

1 mark New variable changed to ensure the switch between selecting a vowel or a consonant `_NumTilesAdded` in this example, but any equivalent appropriate variable

1 mark Random letter still correctly added to the array

1 mark Random number generator selects from vowels, giving each equal probability

1 mark Vowel is correctly added to the array

1 mark Variable is changed to ensure that the next selection will be a random letter

```
def Add(self):
  if self._Rear < self._MaxSize - 1:
    RandNo = random.randint(0, 25)
    if self._NumTilesAdded >=3:
      if self._NumTilesAdded % 3 == 0: #choose a vowel
        while RandNo not in [0, 4, 8, 14, 20]:
          RandNo = random.randint(0, 25)
      else: # choose a consonant
        while RandNo in [0, 4, 8, 14, 20]:
          RandNo = random.randint(0, 25)
    self._NumTilesAdded += 1
    self._Rear += 1
    self._Contents[self._Rear] = chr(65 + RandNo)
```

1 mark Selecting the random starting hand should display every third letter as a vowel (other letters could be anything)

```
Enter your choice: 1

Player One it is your turn.

Your current hand: KEIMQEHXUDBUCLU
```

Question 15

1 mark Call to `ResolveBlanks`, with Choice as an argument, before the call t

1 mark Value returned from call to `ResolveBlanks` stored in a new variable

1 mark New variable passed as the first argument to `Che WordIsValid`

```
else:
  ValidWord = Che nTiles(Choice, PlayerTi
if ValidWord
  di = ResolveBlanks(Choice)
  dWord = CheckWordIsValid(WordToPlay, Allowed
```

1 mark "-" letter added to `TileDictionary` with a value of 0 (by modifying C

```
    else:
      TileDictionary[chr(65 + Count)] = 5
  TileDictionary["-"] = 0
  return TileDictionary
```

1 mark Method declaration for `ResolveBlanks` with one parameter (**R:** any o variation in case) (**A**: Any sensible name for the parameter)

1 mark Variable to store user input for the value of a blank tile

1 mark Loop to ensure all dashes are found (**R:** if pr ould fail in the abs

1 mark Selection statement to handle presence of a dash

1 mark User is prompt r value of blank tile:' (**R:** alternative wording

1 mark U t is stored in variable

1 mark Input is converted to upper case

1 mark Dash would be replaced by the user input in all cases

1 mark Structure ensures that all dashes would be replaced by characters ente

1 mark Word correctly returned (with letters instead of blanks)

```
def ResolveBlanks(PlayerWord):
  Word = ""
  for Letter in PlayerWord:
    if Letter == "-":
      Letter = input("Enter valu blank tile:").up
    Word += Letter
  return Word
```

1 mark Output for `han--`, followed by entering 'd' then 'y', results in 'Valid wo

```
>han--

Enter value of blank tile:d
Enter value of blank tile:y

Valid word

Do you want to:
     replace the tiles you used (1) OR
     get three extra tiles (2) OR
     replace the tiles you used and get three extra tiles (3)
     get no new tiles (4)?
>4

Your word was: HAN--
Your new score is: 55
You have played 5 tiles so far in this game.

Press Enter to continue
```

1 mark Output for `ha---` results in 'Not a valid attempt, you lose your turn.'

```
Your current hand: --AHANDENONSARJ

Either:
     enter the word you would like to play OR
     press 1 to display the letter values OR
     press 4 to view the tile queue OR
     press 7 to view your tiles again OR
     press 0 to fill hand and stop the game.
>ha---

Not a valid attempt, you lose your turn.


Your word was: HA---
Your new score is: 50
You have played 0 tiles so far in this game.

Press Enter to continue
```

Name	

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Summer 2018

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Total marks:

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Answer all questions.
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Q		Answer
1	(a)	
	(b)	
	(c)	
	(d)	
	(e)	
	(f)	
	(g)	
	(h)	
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Programming Tasks

Answer all questions.
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Q	Answer
1	
2	
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