

Zonan's Heroic Escape

Python Game Design

Time: 60 mins

Introduction

In this class, the student/s will learn to add game states to start, end, and restart the game using variables and conditionals and help Zonan protect himself from falling off, avoid obstacles like attacks from the dragon named Pyroclaw, and circular saw blades on the stairs to climb up the floating stairs to reach the dark wizard's lair.

New Commands Introduced

- `resetGame()` User-defined function to reset the game elements.

Vocabulary

- **Game states:** A series of game events at an instant make up a game state.
- **ASCII** stands for American Standard Code for Information Interchange. A unique number is used to represent the numbers from 0-9, lower case letters a-z, upper case letters A-Z, and some special characters. Below is the reference ASCII table:

ASCII TABLE

Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char
0	0	[NULL]	32	20	[SPACE]	64	40	@	96	60	`
1	1	[START OF HEADING]	33	21	!	65	41	A	97	61	a
2	2	[START OF TEXT]	34	22	"	66	42	B	98	62	b
3	3	[END OF TEXT]	35	23	#	67	43	C	99	63	c
4	4	[END OF TRANSMISSION]	36	24	\$	68	44	D	100	64	d
5	5	[ENQUIRY]	37	25	%	69	45	E	101	65	e
6	6	[ACKNOWLEDGE]	38	26	&	70	46	F	102	66	f
7	7	[BELL]	39	27	'	71	47	G	103	67	g
8	8	[BACKSPACE]	40	28	(	72	48	H	104	68	h
9	9	[HORIZONTAL TAB]	41	29	)	73	49	I	105	69	i
10	A	[LINE FEED]	42	2A	*	74	4A	J	106	6A	j
11	B	[VERTICAL TAB]	43	2B	+	75	4B	K	107	6B	k
12	C	[FORM FEED]	44	2C	,	76	4C	L	108	6C	l
13	D	[CARRIAGE RETURN]	45	2D	-	77	4D	M	109	6D	m
14	E	[SHIFT OUT]	46	2E	.	78	4E	N	110	6E	n
15	F	[SHIFT IN]	47	2F	/	79	4F	O	111	6F	o
16	10	[DATA LINK ESCAPE]	48	30	0	80	50	P	112	70	p
17	11	[DEVICE CONTROL 1]	49	31	1	81	51	Q	113	71	q
18	12	[DEVICE CONTROL 2]	50	32	2	82	52	R	114	72	r
19	13	[DEVICE CONTROL 3]	51	33	3	83	53	S	115	73	s
20	14	[DEVICE CONTROL 4]	52	34	4	84	54	T	116	74	t
21	15	[NEGATIVE ACKNOWLEDGE]	53	35	5	85	55	U	117	75	u
22	16	[SYNCHRONOUS IDLE]	54	36	6	86	56	V	118	76	v
23	17	[ENG OF TRANS. BLOCK]	55	37	7	87	57	W	119	77	w
24	18	[CANCEL]	56	38	8	88	58	X	120	78	x
25	19	[END OF MEDIUM]	57	39	9	89	59	Y	121	79	y
26	1A	[SUBSTITUTE]	58	3A	:	90	5A	Z	122	7A	z
27	1B	[ESCAPE]	59	3B	;	91	5B	[	123	7B	{
28	1C	[FILE SEPARATOR]	60	3C	<	92	5C	\	124	7C	|
29	1D	[GROUP SEPARATOR]	61	3D	=	93	5D	]	125	7D	}
30	1E	[RECORD SEPARATOR]	62	3E	>	94	5E	^	126	7E	~
31	1F	[UNIT SEPARATOR]	63	3F	?	95	5F	_	127	7F	[DEL]

Learning Objectives

Student/s should be able to:

- **Recall** how to use variables and handle keypress events.
- **Describe** how to add and update game states in the game.
- **Explain** how to detect collisions between two game objects to update the game state.
- **Explain** ASCII value.
- **Program** different game behaviors when the game starts, ends, and restarts.

Activities

1. Class Narrative: (2 mins)

- Brief the student/s that the floating stairs leading to the wizard's lair are protected by a dragon named Pyroclaw. Zonan has to protect himself and climb up the floating stairs to reach the dark wizard's lair.

2. Concept Introduction Activity: (5 mins)

- Let the student/s play the explore activity using arrow keys to climb the floating stairs and avoid the obstacles in the game.
- Highlight different game behaviors- The game is **over** when Zonan successfully escapes the dragon attacks and reaches the dark wizard's lair, and **restart** the game when Zonan cannot escape the attacks by the dragon or falls from the stairs.
- Brief the student/s using slides that they will learn to start, end, and restart the game.

3. Activity 1: Start the Game: (12 mins)

Teacher Activity: (6 mins)

- Explain to the student/s how to set the game state to **initial** using variables. Explain to the student/s how to display a message to start the game using `image()` and conditionals.
Note: Help the student/s to recall to redeclare a variable using the **global** keyword within the function.
- Highlight that the background keeps moving in the **initial** state, but it should happen only when the game is being played, i.e. the game state is **play**.

Student Activity: (6 mins)

- Guide the student/s to set the game state as **play** when the space key is pressed.
- Guide the student/s to set the behavior of the game elements like moving the background only in the **play** state. Highlight that the floating stairs are not visible in the **initial** state and guide the student/s to fix it.

4. Activity 2: End the Game: (12 mins)

Teacher Activity: (5 mins)

- Explain to the student/s the different scenarios when the game ends- Zonan collides with the circular saw blades and the fireballs and also when he falls and crosses the bottom edge of the canvas.
- Probing question: Which helper function can be used to detect collision between two game objects?
Expected answer: `isTouching()` helper function.
- Explain to the student/s how to change the game state to **over** when the collision is detected between the circular saw blades and Zonan using the `isTouching()` helper function.

Student Activity: (7 mins)

- Guide the student/s to update the game state to **over** when Zonan collides with the fireballs and also when he falls and crosses the bottom edge of the canvas.
- Highlight to the student/s that the image used for game over is added when the game state is **over**.

5. Activity 3: Restart the Game: (12 mins)

Teacher Activity: (6 mins)

- Explain to the student/s using slides that when a game needs to restart, a message to restart the game is displayed. The game restarts by repositioning all the game elements when a particular key (in the game 'R' or 'r' key) is pressed.
- Highlight that the `keyCode` value of the letter 'R' and 'r' is 82.

Student Activity: (6 mins)

- Guide the student/s to update the game state to **play** when the 'R' key is pressed and the game is in the "over" state and reset the game using `resetGame()` helper function that repositions the game elements.

6. Introduce the Post class project: (2 min)

- In the game 'The Onerous Drive', add game states to play, over and restart the game.

7. Test and Summarize the class learnings: (5 mins)

- Check for understanding through quizzes and summarize learning after respective missions.

- Summarize the overall class learning towards the end of the class.

8. Additional activities:

- Encourage the student/s to add functionality to pause and resume the game.
- Encourage the student/s to add an option to restart the game after the game is paused.
Note: The ASCII value for the letters 'P' and 'S' are 80 and 83 respectively.

9. State the Next Class Objective: (1 min)

- We will learn to help Zonan to duel with the Dark Wizard and reclaim the gem.

U.S. Standards:

CSTA: 2-AP-11, 2-AP-12

Links Table		
Activity	Activity Name	Link
Class Presentation	Zonan's Heroic Escape	https://s3-whjr-curriculum-uploads.whjr.online/350e0e02-ebe4-46d6-9776-e61f4381f3a7.html
Explore Activity	Explore Activity: Zonan's Heroic Escape	https://www.tynker.com/code/view/6307bf7aae42db1d0515afe2/
Teacher Activity 1	Add a Game State	https://tynker.com/code/project/6307b8ed32b8ce4b890f2142
Teacher Activity 1 Solution	Add a Game State - Solution	https://tynker.com/code/project/6307ba84838476048e7079c2
Student Activity 1.1	Set the Game State to Play	https://tynker.com/code/project/6307bae8d6cf46719f6c4632
Teacher Reference: Student Activity 1.1 Solution	Set the Game State to Play - Solution	https://tynker.com/code/project/6307bb4f47e5a23ac62adcd2
Student Activity 1.2	Start the Game on Keypress	https://tynker.com/code/project/6307c0edeb3c23150a0ab092
Teacher Reference: Student Activity 1.2 Solution	Start the Game on Keypress - Solution	https://tynker.com/code/project/6307bdba254a731bb85ec1b2
Teacher Activity 2	End the Game	https://tynker.com/code/project/63231fe4c294085f4e4ce942
Teacher Activity 2 Solution	End the Game - Solution	https://tynker.com/code/project/63231e40ce43af065235cb52
Student Activity 2	End the Game	https://tynker.com/code/project/6307c0bf616157307931b7e2

Teacher Reference: Student Activity 2 Solution	End the Game - Solution	https://tynker.com/code/project/6307bdf9b094530dff5b3b72
Student Activity 3	Restart the Game	https://tynker.com/code/project/6307c07a4e6cb370971136a92
Teacher Reference: Student Activity 3 Solution	Restart the Game - Solution	https://tynker.com/code/project/6307bf7aae42db1d0515afe2
Student's Additional Activity 1	Pause and Resume the Game	https://tynker.com/code/project/630d74ac1e82381aa11f9182
Teacher Reference: Student's Additional Activity 1 Solution	Pause and Resume the Game - Solution	https://tynker.com/code/project/630d73d90b3b23605f353762
Student's Additional Activity 2	Restart the Game when Paused	https://tynker.com/code/project/630d75dc1948552052233ce2
Teacher Reference: Student's Additional Activity 2 Solution	Restart the Game when Paused - Solution	https://tynker.com/code/project/630d776871aa5b272e5666c2
Post Class Project	The Thrilling Drive - II	https://tynker.com/code/project/630e2123c9695056cb150952
Teacher Reference: Post Class Project Solution	The Thrilling Drive - II - Solution	https://tynker.com/code/project/630e1ceced47bf7656318ea2