

GAMEMAKER
500
PROGRAMMING
CHALLENGES

FPEE PDF
PREVIEW

Ben Tyers

GAMEMAKER

500
PROGRAMMING
CHALLENGES



RESOURCES
INCLUDED

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To Download The Example Projects
Please Visit:
<https://www.gamemaker.at/preview>

DEDICATION

Thanks To Mark Overmars For Creating Some Awesome Software.

Additional Thanks To YoYo Games & Opera For Taking GameMaker To The Next Level.

ACKNOWLEDGMENTS

Check-mark: Icon: <https://www.freepik.com/>

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Introduction

This book contains 500 GameMaker projects to test and increase your GML and game design skills.

Each challenge contains a title, brief explanation, a project outline, useful functions and variables, and a hint on tackling the challenge.

Each challenge also shows a difficulty guide from 1 (easy) to 5 (most challenging). There is also a check-box you can use to mark if you have completed the challenge.

At rear of the book is a detailed index, which covers the main functions and in-built variables used in the challenges. If you are having issues getting your head around a function, then look it up and tackle all the challenges that use it (referencing the example downloadable solution). After using it in a few basic projects, I'm sure you will up with a better understanding.

I have not included a break-down of what the functions and built-in variables do and how they work, you can check-out **GameMaker's Manual** for a description, break-down, and in most cases an example usage:

<https://manual.gamemaker.io/>

You can download an example solution, with comments, for each project. See:

<https://www.gamemaker.at/download>

I hope you find my book useful and I wish you luck on your future game projects.



1 Keep Instance In Room

Difficulty
1/5

Keep the instance within the room's boundary.



Project Outline:

To keep x and y values within a certain range.

Useful Functions and Built-in Variables:

`clamp`

Hints on Tackling This Assignment:

Using clamp you can set it to keep a value within the range of two other given values.



2 Line Of Sight

Difficulty

1/5

Looks for a line of sight from enemy to player, without a crate between them.



Project Outline:

Find a way to detect if there is / is not a crate between the player and an enemy. Draw a line between them if they can see each other.

Useful Functions and Built-in Variables:

`collision_line`

`draw_line`

Hints on Tackling This Assignment:

Using `collision_line` you can set a variable to true or false depending on the outcome.



3 Simple Level Complete Save System

Difficulty
2/5



To load and save the players current level.

Project Outline:

Allow user to change the level using the mouse, save and load this

Useful Functions and Built-in Variables:

```
ini_open ini_close  
ini_read_real clamp  
ini_write_real
```

Hints on Tackling This Assignment:

Allow some basic input to change a level variable. Save and load this variable.



4 Seeking Missile

Difficulty
2/5

Create a missile that seeks out an enemy instance.



Project Outline:

Allow user to co click to spawn a missile that flies towards to the position of the nearest enemy, by gradually changing it's flight angle. Destroy enemy and missile upon a successful collision.

Useful Functions and Built-in Variables:

```
instance_nearest  
instance_exists  
angle_difference  
instance_destroy  
instance_create_layer
```

Hints on Tackling This Assignment:

Create a missile upon a mouse click, and change direction gradually to face the enemy.



5 Draw Health As Bars

Difficulty
2/5

Draws health as separate sections.



Project Outline:

To display visually the players current health as bars.

Useful Functions and Built-in Variables:

```
for  
draw_rectangle  
draw_set_color  
health
```

Hints on Tackling This Assignment:

Use the players health and draw rectangles based upon this value.

Use a for loop to aid calculating the positions required.

6 Ellipse Movement

Difficulty
4/5



Make an instance in an ellipse.



Project Outline:

Use some basic maths to make an instance move around on an elliptical path.

Useful Functions and Built-in Variables:

`sin`
`cos`
`pi`
`if`
`else`

Hints on Tackling This Assignment:

Look up some basic trigonometry
use the math functions.



7 Draw Contents Of 2D Array

Difficulty
2/5



Draw data stored in a two-dimensional array.

Project Outline:

Two draw a grid containing the data taken from a 2 dimensional array. Populate this array with the 2 times table.

Useful Functions and Built-in Variables:

```
draw_text  
for  
draw_rectangle  
draw_set_colour
```

Hints on Tackling This Assignment:

Loop through two for loops by creating a nested loop. Use these values to both access data in array and to draw it.



8 Adaptable Engine Noise

This code changes the pitch of an engine noise based on its speed.

Difficulty
2/5



Project Outline:

Change the pitch of a playing sound, based on speed of the player

Useful Functions and Built-in Variables:

```
clamp audio_play_sound  
audio_sound_pitch  
mouse_check_button  
clamp
```

Hints on Tackling This Assignment:

Allow user to change a speed value, then set the pitch of the playing sound based on this value.



9 Drag-able Objects

Difficulty
2/5

Allow user to click and drag an instance around the room.



Project Outline:

Allow use to press and hold left mouse button, allowing dragging around the room. If there are 2 or more instances at any position, only allow movement of one of them.

Useful Functions and Built-in Variables:

```
position_meeting  
mouse_check_button_pressed  
global  
mouse_check_button_released
```

Hints on Tackling This Assignment:

Get an id of a single instance and allow moving of just that instance.



10 Mini Map

Difficulty
3/5

Draw a mini map of nearby instances.



Project Outline:

Draw a mini map to give player visual info on nearby instances.

Useful Functions and Built-in Variables:

with
if draw_sprite
draw_rectangle
point_distance
lengthdir_x
lengthdir_y

Hints on Tackling This Assignment:

Get the distance and direction of instances relative to the player.

Use this to draw mini sprites and same direction and a fraction of the distance.

11 Trail Effect

Difficulty

2/5



Make a system for drawing an image trail



Project Outline:

Create a trail that remembers (n) previous positions and draws a sprite at those positions with a reduced alpha Value based on how far away.

Useful Functions and Built-in Variables:

`array_create`
`array_delete`
`array_push`
`array_length`
`draw_sprite_ext`

Hints on Tackling This Assignment:

You can create an array and push in positions of the player. You can also test the length of an array and delete values if above a certain length



12 Change Image On Mouse Interaction

Difficulty
1/5



Change a button sprites image
based on mouse interaction.

Project Outline:

Change the sub-image of button based on mouse over,
button pressed, or no interaction.

Useful Functions and Built-in Variables:

`instance_position`
`mouse_check_button`
`image_index`

Hints on Tackling This Assignment:

Change the image index of a sprite
based on whether mouse is over
or not, and if mouse is over and
button held down.



13 Mouse Pointer Point Direction

Difficulty
1/5



Draw a sprite as a pointer, pointing in the direction of target and slowly moves

Project Outline:

Draw a sprite as a pointer that slowly moves to the mouse's position, pointing in the direction of the target position. Hide the default mouse cursor

Useful Functions and Built-in Variables:

```
move_towards_point  
point_distance_to_point  
window_set_cursor  
mouse_x  
mouse_y
```

Hints on Tackling This Assignment:

Get the direction from current position to mouse's position.
Slowly move to that location.



14 Power Up

Difficulty
2/5

Find a simple solution for managing a power up that lasts for a given amount of time.



Project Outline:

Change a variable when a key is pressed. Reset the variable after a given amount of time.

Useful Functions and Built-in Variables:

`keyboard_check_pressed`
`alarm`
`game_get_speed`

Hints on Tackling This Assignment:

Check for keypress and value, set alarm and flag accordingly.



15 Push-able Block

A simple pushing system.

Difficulty
3/5



Project Outline:

Allow player to push a block when moving

Useful Functions and Built-in Variables:

```
place_meeting  
mouse_check_button
```

Hints on Tackling This Assignment:

Move the player with mouse buttons. Move crate if colliding with the player.

16 Radar

Difficulty

3/5



Make an adaptable radar system.



Project Outline:

To create a radar screen and blips of instances near the player.

Useful Functions and Built-in Variables:

```
with  
if draw_sprite  
draw_rectangle  
point_distance  
lengthdir_x  
lengthdir_y
```

Hints on Tackling This Assignment:

Get the distance and direction of instances relative to the player.

Draw mini sprites at a fraction of the distance. Draw shapes for the screen.



17 Random Word From A Text File

Select a random word from a text file.

Difficulty
4/5



Project Outline:

To open and read all words from a text file, and choose one word at random.

Useful Functions and Built-in Variables:

```
file_text_open_read  
file_text_read_string  
file_text_readln  
file_text_close
```

Hints on Tackling This Assignment:

Read words from a text file and store in an array. Then choose one entry at random.



18 Real Time Clock Example

Draws the players local time according to the system clock.

Difficulty
2/5



Project Outline:

Grab the players system time and draw as text.

Useful Functions and Built-in Variables:

`current_hour`
`current_minute`
`current_second`
`string_repeat`
`string_length`

Hints on Tackling This Assignment:

Get current system time, format it with leading 0's as required, and draw on screen.



19 Score With Leading Zeros

Difficulty
1/5



Devise a simple method of drawing a score with leading 0's

Project Outline:

To format a score with a given number of leading 0's for
Example 000736.

Useful Functions and Built-in Variables:

```
string_repeat  
string_length  
draw_text
```

Hints on Tackling This Assignment:

Set a variable to a random number, and format it with leading 0's.



20 Fading Moving Text

Create moving fading text, great providing info to the player.

Difficulty
2/5



Project Outline:

Take a string and draw it moving and fading.

Useful Functions and Built-in Variables:

```
array_length  
draw_set_*  
draw_text_ext
```

Hints on Tackling This Assignment:

Place sentences in an array, and draw each in sequence that moves upwards and fades.



21 Cool Down System

Difficulty
3/5



A system that limits how often a player can shoot / attack / or perform other actions.

Project Outline:

Place a limit on how often a player can fire their weapon.

Useful Functions and Built-in Variables:

`clamp`

`mouse_check_button_pressed`

Hints on Tackling This Assignment:

Use a flag to determine whether a player can shoot or not, and to increase meter. If hit meter is max value, prevent shooting until reset.



22 Sliding Bar

Difficulty

2/5

Create a sliding bar that the player can use to select a value.



Project Outline:

An adaptable system that allows the player to select a value by dragging a moving bar.

Useful Functions and Built-in Variables:

`mouse_x`

`mouse_y`

`mouse_check_button_released`

`draw_sprite`

Hints on Tackling This Assignment:

Detect if mouse button is pressed

over a bar, if it is, move an

indicator to that position.



23 Slowly Move

Difficulty

1/5

Slowly move to a position.



Project Outline:

A system that slowly moves to the player's position.

Useful Functions and Built-in Variables:

`mouse_x`

`mouse_y`

`lerp`

Hints on Tackling This Assignment:

Use `lerp` to move an instance to the mouse's position, moving faster when further away.



24 Rising Smoke Effect

Difficulty
2/5

Create a rising and fading smoke effect.



Project Outline:

To use a sprite to make an interesting smoke rising effect.

Useful Functions and Built-in Variables:

```
motion_set  
instance_destroy  
draw_sprite_ext
```

Hints on Tackling This Assignment:

Create an instance that moves up and slowly fades out, that is then destroyed.



25 Typewriter Text Effect

Difficulty
3/5

To draw text, one character at a time.



Project Outline:

Make a typewriter effect by drawing characters from a string one at time.

Useful Functions and Built-in Variables:

alarm
string_copy
string_length
draw_text

Hints on Tackling This Assignment:

Take one letter from a string and add it to another string, using an alarm to slowly do this. Display this string in a draw event.



26 Level Unlock System

To create a system that unlocks levels for the player.

Difficulty
3/5



Project Outline:

Create a visual system that shows the player which levels are currently locked / unlocked.

Useful Functions and Built-in Variables:

`clamp`
`global`
`mouse_check_button_pressed`

Hints on Tackling This Assignment:

Use a global value that can change on input. Use variable definitions to set values for different objects that draw differently depending on locked / unlocked status.



27 Weapon Management

A method e for storing info for multiple weapons.

Difficulty
2/5



Project Outline:

A system that allows the user to swap between different Weapons, firing a different projectile for each.

Useful Functions and Built-in Variables:

```
global  
if  
audio_play_sound  
mouse_check_button  
draw_text  
draw_sprite
```

Hints on Tackling This Assignment:

Use an array to hold weapon data.

Reduce money and increase amount of money if enough cash.

Allow shooting of the weapon.

Play appropriate sound for each action.



28 Top Down Character Control

4 direction movement and sprite control.

Difficulty
3/5



Project Outline:

Create a system with a character that can move in four directions, with a different sprite for each direction, and whether moving or not.

Useful Functions and Built-in Variables:

enum
keyboard_check
if
switch

Hints on Tackling This Assignment:

Set a sprite for each direction, and whether currently moving or not.
Use a state machine to keep track.
Draw appropriate sprite.



29 Blood Effect Using Particles

Create a blood effect using particles.

Difficulty
3/5



Project Outline:

A particle system to create a basic blood effect.

Useful Functions and Built-in Variables:

```
part_system_create  
part_system_depth  
part_system_destroy  
part_type_*  
part_particles_create
```

Hints on Tackling This Assignment:

Create a particle system by setting attributes. Display on screen at location of mouse when button is pressed.



30 Draw Text Info With Background

Difficulty
1/5



To make a simple script that can be used to draw info text for the player.

Project Outline:

Make a basic system to show formatted text with a background.

Useful Functions and Built-in Variables:

`draw_rectangle`
`draw_text`
`game_get_speed`
`alarm`

Hints on Tackling This Assignment:

Create a script that takes in a string and draws it over a rectangle. Set it to destroy after 3 seconds.



31 Speed Boost

Difficulty
2/5

Create a system to allow a temporary increase of an instance's max speed.



Project Outline:

Allow the player to temporary increase the max speed they can move at.

Useful Functions and Built-in Variables:

`move_towards_point`
`mouse_*`
`draw_text`

`game_get_speed`

Hints on Tackling This Assignment:

Use a true / false flag to determine if player currently has boost. On collision set flag to true and start alarm. On alarm reset flag.



32 Projectile Curved Path

Difficulty
1/5



Makes a projectile follow a curved path to target.

Project Outline:

A system to allow the player to create a projectile that follows a curved projectory.

Useful Functions and Built-in Variables:

```
path_add  
path_set_kind  
path_add_point  
path_start
```

Hints on Tackling This Assignment:

Add points on a path that the weapon follows.



33 Draw Power Bar With Image Background

Difficulty
2/5



Draw power, health, boost etc, using an image as the background.

Project Outline:

Make a system that shows a value by drawing part of a sprite.

Useful Functions and Built-in Variables:

```
mouse_check_button  
clamp  
draw_rectangle
```

Hints on Tackling This Assignment:

Allow mouse buttons to change values. Draw background and draw a solid rectangle to cover up areas.



34 Create Muzzle Flash

Difficulty

2/5

Create a muzzle flash for a rotating weapon.



Project Outline:

A weapon that can rotate and fire, creating a muzzle flash that is shown at the correct position and direction.

Useful Functions and Built-in Variables:

`mouse_check_button`
`image_angle`
`instance_create_layer`
`lengthdir_*`

Hints on Tackling This Assignment:

Allow player to rotate a turret.
Create a muzzle flash, sending though the creator's id. Rotate flash to match creators angle.
Destroy when animation is done.



35 Cloud Effect Using Filters & Effects

Difficulty
1/5



Make use of the powerful filters and effects layer

Project Outline:

Use GameMaker's effect layer to create a cloud effect.

Useful Functions and Built-in Variables:

No code.

Hints on Tackling This Assignment:

Create a cloud effect layer and set to something you like the look of.



36 Missile Smoke Trail

Difficulty
2/5

Create smoke trail effect.



Project Outline:

Create a smoke effect trail for a moving projectile.

Useful Functions and Built-in Variables:

```
move_towards_point  
point_direction  
directional  
image_angle  
effect_create_above  
lengthdir_*
```

Hints on Tackling This Assignment:

Create an instance that moves towards the mouse's position, draw an effect at the rear of the instance, using `lengthdir_*`.



37 Selectable Stats

Difficulty

3/5

Allow the player to choose a player object with various stats.



Project Outline:

Display a number of characters with different attributes that the player can choose from.

Useful Functions and Built-in Variables:

alarm
draw_rectangle
draw_line
for
draw_text

Hints on Tackling This Assignment:

Populate an array with data of sprite image and stats. Loop through using an alarm. Save to global values if current option is selected.



38 Add Playing Cards & Shuffle

To shuffle a deck of playing cards.

Difficulty
3/5



Project Outline:

Use a suitable data structure to store playing card, then shuffle and and select a card at random. Display the card as a sprite and text.

Useful Functions and Built-in Variables:

```
ds_list_create ds_list  
sprite_get_name  
ds_list_delete  
real  
string
```

Hints on Tackling This Assignment:

Add cards to a list or an array, shuffle the values and then choose the top card. Draw this sprite on screen and text detailing the card.



39 Enemy Track Player's Movement

Difficulty
1/5



An enemy that matches players movement.

Project Outline:

To make an enemy that follows the player's movement on the y position.

Useful Functions and Built-in Variables:

`mouse_y`

Hints on Tackling This Assignment:

Move the enemy up or down to the player's y location.



40 Tool Tip Pop Up

Difficulty
2/5

Create a system to provide info to the player on mouse over.



Project Outline:

To draw an image and text when the mouse cursor is over an Instance.

Useful Functions and Built-in Variables:

```
instance_position  
draw_sprite  
draw_text  
draw_set_colour
```

Hints on Tackling This Assignment:

Detect if mouse is over an instance, if it is draw some data over a sprite bubble.



41 Pop Up Wobbly Text

Difficulty
2/5

To make simple text effect, that wobbles.



Project Outline:

To take a given string and draw it with a wobbling fading Effect.

Useful Functions and Built-in Variables:

```
sin  
draw_text_transformed  
draw_set_alpha
```

Hints on Tackling This Assignment:

Use a sine wave to make the text wobble. Change the y position and alpha to make it move up and fade.



42 Grow and Shrink Message Control

To provide info to the player by drawing text

Difficulty
2/5



Project Outline:

Create a system to draw text that shrinks then grows.

Useful Functions and Built-in Variables:

`image_xscale`
`image_yscale`
`game_get_speed`

Hints on Tackling This Assignment:

Use a flag to determine if the sprite is growing or shrinking.
Gradually change the scale of the sprite.



43 Smoothly Move To Mouse Position

Difficulty

1/5



To move smoothly to a position, in this example the mouse's position.

Project Outline:

To move an instance to the mouse position.

Useful Functions and Built-in Variables:

`mouse_x`

`mouse_y`

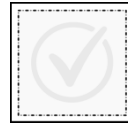
Hints on Tackling This Assignment:

Move to the mouse cursor's position at a predefined speed.



44 Bounce Off Room Border

Difficulty
1/5



Make a system to make an instance bounce off the room's border.

Project Outline:

To track the instances position, and change direction on collision with the room's border.

Useful Functions and Built-in Variables:

speed
direction
room_width
room_height

Hints on Tackling This Assignment:

Move the player with mouse buttons. Move crate if colliding with the player.



45 Pause Music When Sound Effect Plays

Difficulty
2/5



Create a method that pauses the background music whilst an audio effect plays.

Project Outline:

Stop music from playing when a sound effect plays, then resume the music when the effect has finished playing.

Useful Functions and Built-in Variables:

`audio_play_sound`
`audio_pause_sound`
`audio_is_playing`
`audio_resume_sound`

Hints on Tackling This Assignment:

Create a variable and set playing sound to it. If sound effect plays, pause the music and resume when effect has finished.

46 Glitch Effect Text

Difficulty
2/5



Create a glitch effect.



Project Outline:

To make some text shake and change colour.

Useful Functions and Built-in Variables:

```
irandom_range  
draw_set_color  
draw_set_font  
draw_text
```

Hints on Tackling This Assignment:

Draw text with some randomness of it's position. Use another random value to change the drawing colour.



47 Wobbly Text

Difficulty
2/5

Make a cool text floating wobble effect.



Project Outline:

Take each letter of a string and make it move up and down using a sine wave.

Useful Functions and Built-in Variables:

```
string_length  
for  
draw_text  
sin
```

Hints on Tackling This Assignment:

Get letters from a string and draw them with changing y values.



48 Choose A Random Instance

Difficulty
1/5

Create a method to choose an instance at random.



Project Outline:

To count all instances and then choose one at random.

Useful Functions and Built-in Variables:

`instance_exists`
`instance_number`
`move_towards_point`
`distance_to_point`
`irandom`

Hints on Tackling This Assignment:

Move the player with mouse buttons. Move crate if colliding with the player.



49 Draw Mini Healthbar For Enemy

Difficulty
1/5



Find a simple method to draw a mini healthbar above an enemy instance.

Project Outline:

Use GameMaker's built function that draws the enemy's Health that follows the instance as it moves.

Useful Functions and Built-in Variables:

`clamp`
`sprite_width`
`sprite_height`
`draw_healthbar`

Hints on Tackling This Assignment:

Draw the healthbar relative to the sprite origin. Base barsize on current hp and starting value.



50 Fade In And Out

Fades a sprite in and out.

Difficulty
1/5



Project Outline:

To gradually change the alpha of sprite so it fades in and out.

Useful Functions and Built-in Variables:

```
draw_sprite_ext  
if  
else
```

Hints on Tackling This Assignment:

Use a flag to determine if the instance is fading in or out.



51 Rotating Text

Difficulty

1/5

Make some rotating text.



Project Outline:

Take a string and rotate it around it's center.

Useful Functions and Built-in Variables:

```
draw_set_font
string_width
lengthdir_*
draw_text_transformed
```

Hints on Tackling This Assignment:

Calculate the width of a string and use that value with angle and `lengthdir_*` functions to set the rotation point.

52 Flashing Text

Make text flash and glow.

Difficulty

2/5



Project Outline:

Take some text and draw it so it flashes.

Useful Functions and Built-in Variables:

`make_colour_rgb`
`current_time`
`random`
`draw_set_color`
`draw_text`

Hints on Tackling This Assignment:

Set a variable to a colour using
`random` and `current_time`.



53 Play Sound At Selected Volume

Play sound at different volumes.

Difficulty
2/5



Project Outline:

To play sound at different volume, depending on user input.

Useful Functions and Built-in Variables:

`mouse_check_button`
`audio_play_sound`

Hints on Tackling This Assignment:

Set an attribute for `audio_play_sound` that plays at a different volume based on player input.



54 Spawn Powerups Control System

Create a system that gives random powerups.

Difficulty
2/5



Project Outline:

To spawn different powerups at random, weighted according to upgrade type.

Useful Functions and Built-in Variables:

floor
random
if
else

Hints on Tackling This Assignment:

Create a random value, and check with a range of values to decide what to do.



55 Move Crosshair To Mouse Position

Move a crosshair to mouse position.

Difficulty

1/5



Project Outline:

To make a system that moves a crosshair to the mouse's position, that wobbles a bit to give some randomness.

Useful Functions and Built-in Variables:

`mouse_x`
`mouse_y`
`distance_to_point`
`move_towards_point`
`speed`

Hints on Tackling This Assignment:

Set a target as the current mouse position and move towards it, when close stop movement.

56 Checkpoint System

Difficulty
2/5



Create a system that remembers the last checkpoint the player visited.



Project Outline:

To store the player's last collision with a checkpoint, and move to that position when the player dies.

Useful Functions and Built-in Variables:

```
function  
camera_get_view_x  
camera_get_view_y  
camera_get_view_width  
camera_get_view_height  
point_in_rectangle
```

Hints on Tackling This Assignment:

Send player coordinates to an array and check position within a rectangle, to determine in view or not.



57 Check If Instance Is In View

Difficulty
3/5

Take an instance's position and check within current view.



Project Outline:

Write a script that takes an instance's position and returns whether it is within the current view.

Useful Functions and Built-in Variables:

`place_meeting`
`mouse_check_button`

Hints on Tackling This Assignment:

Move the player with mouse buttons. Move crate if colliding with the player.

58 Jump Through Platforms

Difficulty
1/5



Create a platform the player can jump through.



Project Outline:

To create a one-way platform that the player can jump through from below.

Useful Functions and Built-in Variables:

`gravity`

`bbox_bottom`

`bbox_top`

`vspeed`

Hints on Tackling This Assignment:

Allow player to jump again if above a crate object, setting `vspeed` to a negative value.



59 Random Level Music

Play random music.

Difficulty
1/5



Project Outline:

Choose random music, from a selection of tracks.

Useful Functions and Built-in Variables:

`choose`
`audio_play_sound`

Hints on Tackling This Assignment:

Use `choose` to select a random track, and `audio play sound` to play it.



60 Exploding Effect

Create a sprite based exploding effect.

Difficulty
2/5



Project Outline:

Split a sprite into multiple parts to create an exploding effect.

Useful Functions and Built-in Variables:

```
sprite_get_number  
for  
instance_create_layer  
direction
```

Hints on Tackling This Assignment:

Use a sprite editor to break a sprite into sections. Count the number of sprites and send each flying in a different direction with help of a for loop



61 Draw Text With Border

Difficulty
2/5

Create a script that draws text with a border.



Project Outline:

Make a script that takes in text and position to draw text with a border.

Useful Functions and Built-in Variables:

```
draw_text  
draw_set_colour
```

Hints on Tackling This Assignment:

Create a script that takes in a string, colours and position. Draw at position with some variance to make a border.



62 Move Coin To Score Text

Difficulty

2/5

Create a coin moving effect that moves it a coin towards the HUD text for displaying score.



Project Outline:

Make an object spawn and move to the position of the players score.

Useful Functions and Built-in Variables:

```
camera_get_view_*  
move_towards_point  
distance_to_point
```

Hints on Tackling This Assignment:

Spawn a coin and make it fade by changing the alpha value. Move to the GUI position, taking current view in to account.



63 Tire Track Effects

Difficulty
3/5

Draws tyre tracks that fade away.



Project Outline:

To draw tyre tracks that fade away, taking into account the direction of the vehicle.

Useful Functions and Built-in Variables:

`lengthdir_*`
`image_angle`
`alarm`
`instance_create_layer`
`draw_sprite_ext`

Hints on Tackling This Assignment:

Use an alarm to create an instance of a tyre track, pass through angle to use. Use `lengthdir_*` to set correct position. Fade out tyre and destroy when done.

64 Fireworks Display

Difficulty
1/5



Create a fireworks display.



Project Outline:

Use GameMaker's built-in effects to create a colourful fireworks display.

Useful Functions and Built-in Variables:

`random_range`
`irandom`
`choose`
`effect_create_above`

Hints on Tackling This Assignment:

Choose a random position in the room, a random size, and random colour. Draw this using `effect_create_above`.



65 Spawn Bullets From Double Weapon

Difficulty
3/5



Spawn bullets for a double-barreled weapon.

Project Outline:

To spawn multiple projectiles at the correct location, taking into account the rotation of the weapon.

Useful Functions and Built-in Variables:

`lengthdir_*`
`image_angle`
`instance_create_layer`

Hints on Tackling This Assignment:

Use `lengthdir_*` recursively to spawn two bullets at the barrels of a double weapon. Send through direction and angle when creating the bullets.

66 Sprite Drop Shadow

Difficulty
1/5



Create a drop shadow effect.



Project Outline:

Use the instances sprite to create a simple drop shadow.

Useful Functions and Built-in Variables:

`draw_sprite_ext`
`draw_sprite`

Hints on Tackling This Assignment:

Draw the shadow by drawing with `draw_sprite_ext` setting colour to black and a partial alpha, at an offset. Draw main sprite above.



67 Simple Top Down Collision

Create a top-down collision system.

Difficulty
3/5



Project Outline:

Create a collision that detects if another instance is to the left or right, if so prevent movement.

Useful Functions and Built-in Variables:

`mouse_check_button`
`lengthdir_*`
`hspeed`
`point_direction`
`other`

Hints on Tackling This Assignment:

Move the player with mouse buttons. Move crate if colliding with the player.



68 Spawn Instance With Random Subimage

Difficulty
2/5



To spawn instance with a random image.

Project Outline:

Make system that calculates the number of subimages an Instance has, and choose one at random.

Useful Functions and Built-in Variables:

`instance_create_layer`
`alarm`
`image_number`
`irandom`
`random_range`

Hints on Tackling This Assignment:

Use an alarm to spawn instances above the room. Select a random subimage and vertical speed.



69 Sine Wave Based Movement

Difficulty
3/5



Make an instance move slowly up and down.

Project Outline:

Use a sine wave to make an instance move slowly up and down.

Useful Functions and Built-in Variables:

```
sin  
current_time
```

Hints on Tackling This Assignment:

Use a sine wave based on
current_time to move an instance
up and down.



70 Draw Player's Speed On Dial

Show a players's speed visually

Difficulty

4/5



Project Outline:

To make a dial with a rotating pin that shows the player's Movement speed.

Useful Functions and Built-in Variables:

`clamp`

`mouse_check_button`

Hints on Tackling This Assignment:

Allow mouse buttons to increase / decrease a speed value within a range. Convert the speed into an angle to draw a pin over a dial.



71 Spawn Trees Border

Difficulty
3/5



Spawn trees on the border of a room.

Project Outline:

To create system that automatically spawns trees on the left and right sides of a room, incorporating some randomness.

Useful Functions and Built-in Variables:

```
room_height  
room_width  
for  
instance_create_layer
```

Hints on Tackling This Assignment:

Calculate how trees by dividing room height by gap distance. Use a for loop to place at edges of room, with a little randomness.



72 One Button Controlled Movement

Difficulty
3/5



Allow the player to move a crosshair around the room with a single button.

Project Outline:

Allow the player to move a crosshair around the room using just a single mouse button as input.

Useful Functions and Built-in Variables:

`mouse_check_button`
`motion_set`

Hints on Tackling This Assignment:

Rotate an indicator around an instance. If mouse button is down, move in the indicators direction.



73 Plane Movement

Difficulty
2/5



Create flexible movement system for a player plane in a side-scrolling shooter.

Project Outline:

Create a player object that can move up and down using a Single mouse button as input. Change the sprite's angle to match direction.

Useful Functions and Built-in Variables:

`mouse_check_button`
`clamp`
`image_angle`
`direction`

Hints on Tackling This Assignment:

Change flying angle based on mouse button down or not.

Change `image_angle` to match direction. Use `clamp` to keep in room and limit turning angle.

74 Player Power Up Creator

Difficulty
2/5



Make a power system that the user must work hard to get.



Project Outline:

Make a system that requires a player to mash a button in order to receive a power up.

Useful Functions and Built-in Variables:

`mouse_check_button_pressed`

Hints on Tackling This Assignment:

Increase a value each time left or right mouse button is tapped.

Reduce value each frame. If target is reached, set a flag to true.



75 Coin Drop Bonus Effect

Creates a cool looking graphical effect.

Difficulty
3/5



Project Outline:

Spawn coins that fall from the top of the room, which then explode and create a graphical effect.

Useful Functions and Built-in Variables:

```
irandom_range  
effect_create_above  
if
```

Hints on Tackling This Assignment:

Spawn an instance above room y, set a random x position, and random distance to travel before exploding. Create effect when distance reached, and destroy.

76 Endless Levels

Difficulty

3/5

Create a level that never ends.



Project Outline:

Create an endless level by using a fixed view, and have Instances move across the screen.

Useful Functions and Built-in Variables:

`sprite_index`
`choose`
`vspeed`
`room_height`
`sprite_height`

Hints on Tackling This Assignment:

Use an alarm to spawn instances above the room that fall down. Repeat to give the appearance of an endless level.



77 Mini Healthbar With Segments

Draw a healthbar with segments.

Difficulty
2/5



Project Outline:

To draw a healthbar and overlay it with lines to create Segments.

Useful Functions and Built-in Variables:

```
clamp  
draw_healthbar  
draw_line
```

Hints on Tackling This Assignment:

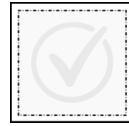
Draw a healthbar with current hp.
Draw vertical lines over the bar.

78 Outline Shader

Difficulty
5/5



Create a white border around an instance.



Project Outline:

Use a basic shader to draw an outline around any given Sprite.

Useful Functions and Built-in Variables:

```
shader_get_uniform  
shader_set_uniform_f
```

Hints on Tackling This Assignment:

An example of setting a shader to adjust a sprite image. Either you know about shaders or not. Just an example of how to apply a shader.



79 Move Crosshair To Target

Difficulty
2/5

Selects a target and moves the crosshair towards it.



Project Outline:

Make a system that chooses a random enemy and moves towards it. On mouse click destroy it and seek out a new target.

Useful Functions and Built-in Variables:

`clamp`
`place_meeting`
`with`
`move_towards_point`

Hints on Tackling This Assignment:

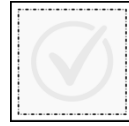
If one or more instances exist, choose one to target. Move crosshair to target. When over it change crosshair sprite. Shoot to kill and select new target.

80 Spawn Items With Gap

Difficulty
4/5



Place multiple instances that move to make a gap between them.



Project Outline:

To make a system that randomly spawns instances, which then move apart.

Useful Functions and Built-in Variables:

```
ds_list_size  
lengthdir_*  
for  
with  
collision_circle_list
```

Hints on Tackling This Assignment:

Spawn instances at random positions in room. Use `collision_circle_list` to instances within range. Loop through these and move them away.



81 Add Scores To A List

Difficulty
3/5

Keep track of player scores.



Project Outline:

To create a system that remembers the players last 10 scores and displays on screen, updating and culling as new scores are added.

Useful Functions and Built-in Variables:

```
ds_list_create  
ds_list_delete  
ds_list_size  
for  
draw_text
```

Hints on Tackling This Assignment:

Add values to an array, culling oldest entry when above a certain length. Use a for loop to position and draw values from the array.



82 Cloud Effect

Create a cloud scrolling effect.

Difficulty
2/5



Project Outline:

Use layers to draw clouds both in front and behind a player.

Useful Functions and Built-in Variables:

`image_index`
`choose`
`sprite_width`
`room_width`

Hints on Tackling This Assignment:

Place a number of cloud objects on layers behind and in front of the player's layer. Set to move at random speed / direction. Wrap round the room.



83 Ball Bouncing Off Instances

Difficulty
1/5

Make a ball bounce off of walls.



Project Outline:

To create a simple system that makes a ball bounce off of wall instances.

Useful Functions and Built-in Variables:

`motion_set`
`choose`
`move_bounce_all`

Hints on Tackling This Assignment:

Set in motion with `motion_set`.
Make the ball bounce off of instances with `move_bounce_all`



84 Keeping A Value In A Range

There will be time when you wish to keep a value within a given range.

Difficulty
1/5



Project Outline:

To keep a variable with in a range of two other values.

Useful Functions and Built-in Variables:

`clamp`

.

Hints on Tackling This Assignment:

Use two variables, one for min value and one for max. Use `clamp` to keep a value in a range between them



85 Film Style Scrolling Credits

Create scrolling text in a film style.

Difficulty
3/5



Project Outline:

To add text values to an array and display them moving up the screen whilst shrinking.

Useful Functions and Built-in Variables:

```
array_length  
alarm room_height  
array_delete  
instance_create_layer  
draw_text_ext_transfor  
med
```

Hints on Tackling This Assignment:

Create an array to hold sentences.
Take top entry when an alarm triggers and send through to a drawing instance. Repeat until all text is shown.



86 Rotate Room View

Difficulty
3/5

Rotate the view of a room.



Project Outline:

Allow player to rotate the view, within a given range.

Useful Functions and Built-in Variables:

```
camera_set_view_angle  
clamp  
mouse_check_button
```

Hints on Tackling This Assignment:

Create a variable for the angle, change with mouse buttons, and use clamp to keep in range. Use the camera function to set this angle.

87 Toggle Full Screen

Difficulty
2/5



Turn full view on and off.



Project Outline:

Allow user to toggle between full and windowed.

Useful Functions and Built-in Variables:

```
window_set_fullscreen  
keyboard_check
```

Hints on Tackling This Assignment:

Allow a keypress to toggle a value between true and false. Use this flag to set as full screen or not.



88 Progress Bar

Difficulty

4/5

Provide a visual clue as to the player's level progress.



Project Outline:

Draw a bar that indicates the player's current level progress.

Useful Functions and Built-in Variables:

```
draw_healthbar  
for  
draw_line
```

Hints on Tackling This Assignment:

Calculate level progress as a percentage. Use this value to draw a healthbar. Use lines to draw segments.



89 Flash Player To Show Damage

Difficulty
3/5

A method to show when the player has taken damage.



Project Outline:

Make the player's sprite temporarily red to indicate that it has received some damage.

Useful Functions and Built-in Variables:

```
alarm  
draw_sprite_ext  
draw_sprite
```

Hints on Tackling This Assignment:

Use a flag to determine if player currently has damage. Use an alarm to reset flag. Draw with red colour if damaged, else draw normally.



90 Fade Between Two Images

Fade in and out between two subimages.

Difficulty
3/5



Project Outline:

Fade between two subimages to create a graphical effect.

Useful Functions and Built-in Variables:

```
enum  
draw_sprite_ext  
if
```

Hints on Tackling This Assignment:

Use a variable that slowly toggles between 0 and 1, using a state machine. Draw an image at this alpha value, and another at 1-this value.

91 Draw A Path As Circles

Difficulty
5/5



Create a method of drawing a path as circles.



Project Outline:

Devise a method to draw equally spaced circles along a path.

Useful Functions and Built-in Variables:

`mouse_check_button`
`direction`
`image_angle`
`clamp`

Hints on Tackling This Assignment:

Set an instance moving at speed. If mouse is down, add to angle, otherwise decrease angle. Make instance move and point to this angle.



92 Simple Top Down Movement Control

Difficulty
3/5



A top down movement system using
a single mouse button.

Project Outline:

To create a system that allows a player to move in a top
down game using only a single mouse button input.

Useful Functions and Built-in Variables:

`clamp`
`mouse_check_button`
`image_angle`
`direction`

Hints on Tackling This Assignment:

Use a variable for rotating that
increases or decreasing
depending if button is down or
not. Move and face direction of
travel. Keep in room using clamp.



93 Laser To Target

Difficulty
3/5

Draw a laser from the instance to a target.



Project Outline:

To draw a laser to the mouse's x position, using drawing functions.

Useful Functions and Built-in Variables:

`draw_line`

`draw_circle`

`mouse_x`

Hints on Tackling This Assignment:

Draw a horizontal line from weapon tip to mouse's x position.

Draw a red circle at laser tip.



94 Bubble Explosion Effect

Create a bubble explosion effect.

Difficulty
3/5



Project Outline:

Create a bubble explosion of multiple bubbles that rise up and pop.

Useful Functions and Built-in Variables:

`choose`
`alarm`
`audio_play_sound`
`instance_create_layer`
`repeat`

Hints on Tackling This Assignment:

Spawn bubbles that move out in random direction and speed. Add some negative gravity to make them float. Destroy with an alarm and play random sound.



Difficulty

4/5

95 Add Instances To A Grid & Move To A Target



Move an instance to target,
avoiding boxes.

Project Outline:

Create grid that blocks out areas where boxes are located,
move from start to end point whilst avoiding the boxes.

Useful Functions and Built-in Variables:

```
mp_grid_create  
mp_grid_add_instances  
mp_grid_path  
path_set_kind  
path_start
```

Hints on Tackling This Assignment:

Make a maze of boxes. Make
instance navigate the path
between start and end points,
whilst avoiding the boxes. Use an
mp_grid_path for this.



96 Image Scale, Fade and Rotate Effect

Difficulty
2/5



Create an effect changes size and fades whilst rotating.

Project Outline:

To create an instance that rotates, grows in size and fades out.

Useful Functions and Built-in Variables:

`choose`

`draw_sprite_ext`

Hints on Tackling This Assignment:

Choose a random direction to rotate. Slowly increase in size and fade out. Use `draw_sprite_ext` to size size and fade out variable.

97 Player Streak

Keep tracks of a player's streak.

Difficulty

2/5



Project Outline:

Keep track of a player's streak count and display on screen.

Useful Functions and Built-in Variables:

`draw_text`

`draw_set_font`

Hints on Tackling This Assignment:

Increase a variable every time something happens. Reset when something else happens. Draw this value onscreen.



98 Numbers As Text

A script that changes numbers to text.



Project Outline:

Convert numbers to text, for example 16783 to sixteen thousand seven hundred and eighty three.

Useful Functions and Built-in Variables:

`div`

`mod`

`switch`

`break`

`return`

Hints on Tackling This Assignment:

Set a variable to a random value upto 100,000. Use a look-up table and logic to convert in text. This will be easier if start at units, tens, hundreds, then thousands.

99 Draw Lives As Images

Difficulty
2/5



Draws the players lives as images.



Project Outline:

To take the player's current number of lives and draw on screen using sprites.

Useful Functions and Built-in Variables:

`lives`
`clamp`
`for`
`draw_sprite`

Hints on Tackling This Assignment:

Loop through a for loop for the number of lives. Use `draw_sprite` to draw them, using values of loop to set position of each sprite. Use `clamp` to keep within a range.



100 Coin Explosion Effect

Create a coin explosion effect.

Difficulty
2/5



Project Outline:

To make a coin explosion effect that shoots out coins in multiple directions.

Useful Functions and Built-in Variables:

```
for  
instance_create_layer
```

Hints on Tackling This Assignment:

Use a for loop that loops through and create a coin that uses it's the loop value to move coins in different directions.



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