

The background is a vibrant, abstract composition of various colored circles and organic shapes. A large orange circle is the central focus, containing the text. Surrounding it are several other shapes: a large yellow circle in the top left, a blue circle in the top right, a green circle in the bottom right, and a blue circle in the bottom left. There are also smaller circles in blue, green, and black, as well as larger, more complex shapes in blue, green, and grey. The overall effect is a playful and modern design.

Fun with Allegro

Bool data type

- A type can only be assigned by two values
 - 0 – means false.
 - 1 – means true.
 - You can just assign true or false to a bool variable.

(eg: `bool HT_good = true;`
`bool a = false;`)

- A data type that in lots of programming language
 - Java, C++ and so on
- Allegro implements a bool data type in itself



Outline

01

Introduction

02

Draw something!

03

Deal with event !

04

Play some music!

05

Supplementary



Outline

01

Introduction

02

Draw something!

03

Deal with event !

04

Play some music!

05

Supplementary

Hello to Allegro

- The functions of allegro

```
#define al_init() (al_install_system(ALLEGRO_VERSION_INT, atexit))
ALLEGRO_DISPLAY* al_create_display(int width, int height);
ALLEGRO_COLOR al_map_rgb(unsigned char r, unsigned char g, unsigned char b);
void al_set_window_position(ALLEGRO_DISPLAY *display, int x, int y)
void al_clear_to_color(ALLEGRO_COLOR color);
void al_flip_display(void);
void al_destroy_display(ALLEGRO_DISPLAY *display);
void al_rest(double seconds);
```

Hello to Allegro

- The functions of allegro

```
#define al_init() (al_install_system(ALLEGRO_VERSION_INT, atexit))
ALLEGRO_DISPLAY* al_create_display(int width, int height);
ALLEGRO_COLOR al_map_rgb(unsigned char r, unsigned char g, unsigned char b);
void al_set_window_position(ALLEGRO_DISPLAY *display, int x, int y)
void al_clear_to_color(ALLEGRO_COLOR color);
void al_flip_display(void);
void al_destroy_display(ALLEGRO_DISPLAY *display);
void al_rest(double seconds);
```

→ A define of other function that return "Bool" type

Hello to Allegro

- The functions of allegro

```
#define al_init() (al_install_system(ALLEGRO_VERSION_INT, atexit))
ALLEGRO_DISPLAY* al_create_display(int width, int height);
ALLEGRO_COLOR al_map_rgb(unsigned char r, unsigned char g, unsigned char b);
void al_set_window_position(ALLEGRO_DISPLAY *display, int x, int y)
void al_clear_to_color(ALLEGRO_COLOR color);
void al_flip_display(void);
void al_destroy_display(ALLEGRO_DISPLAY *display);
void al_rest(double seconds);
```

→ A function that return "the pointer of ALLEGRO_DISPLAY" type

Hello to Allegro

- The functions of allegro

```
#define al_init() (al_install_system(ALLEGRO_VERSION_INT, atexit))
ALLEGRO_DISPLAY* al_create_display(int width, int height);
ALLEGRO_COLOR al_map_rgb(unsigned char r, unsigned char g, unsigned char b);
void al_set_window_position(ALLEGRO_DISPLAY *display, int x, int y)
void al_clear_to_color(ALLEGRO_COLOR color);
void al_flip_display(void);
void al_destroy_display(ALLEGRO_DISPLAY *display);
void al_rest(double seconds);
```

→ A function that return "ALLEGRO_COLOR" type

Hello to Allegro

- The basic componenet – display a window!

include

Init

Display

Destroy

Hello to Allegro

- The basic componenet – display a window!

include

Init

Display

Destroy

```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

Include the function in <allegro5/allegro.h>.

Hello to Allegro

- The basic componenet – display a window!

include

Init

Display

Destroy

```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

```
void game_init() {
    al_init()
    display = al_create_display(width, height);
    al_set_window_position(display, 0, 0);
}
```

Initialize the function in
<allegro5/allegro.h>.

Hello to Allegro

- The basic component – display a window!

include

Init

Display

Destroy

```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

```
void game_init() {
    al_init()
    display = al_create_display(width, height);
    al_set_window_position(display, 0, 0);
}
```

Set the window
with width and
height

Hello to Allegro

- The basic component – display a window!

include

Init

Display

Destroy

```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

```
void game_init() {
    al_init()
    display = al_create_display(width, height);
    al_set_window_position(display, 0, 0);
}
```

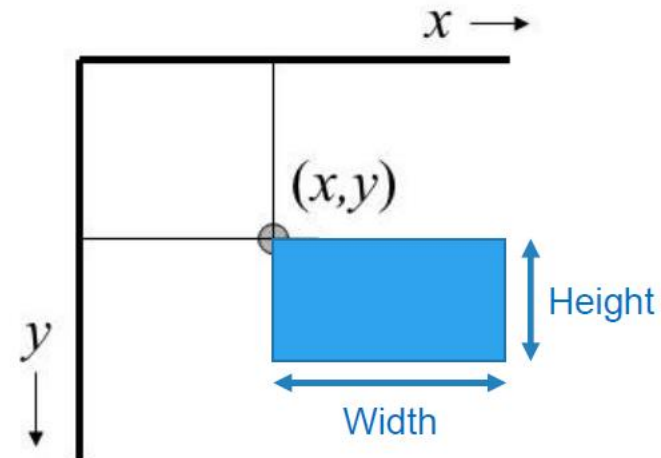
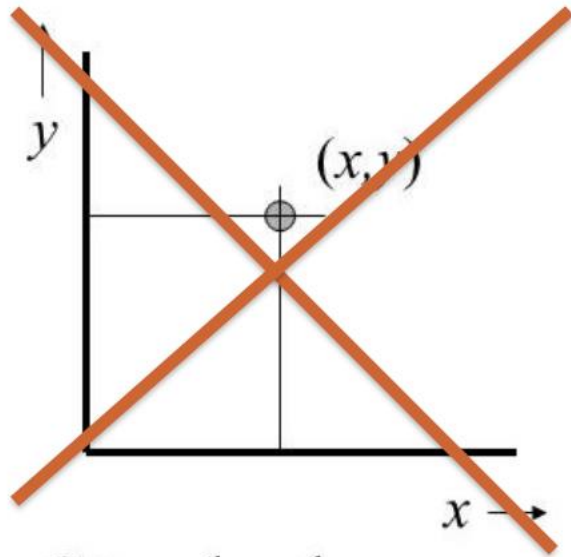
Set the window
with position

Hello to Allegro

- The basic componenet – display a window!



Position of window



Screen (output, input)

Hello to Allegro

- The basic componenet – display a window!

include

Init

Display

Destroy

```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

```
void game_begin() {
    al_clear_to_color( al_map_rgb(255, 0, 0) );
    al_flip_display();
}
```

Fill the window
with red

Hello to Allegro

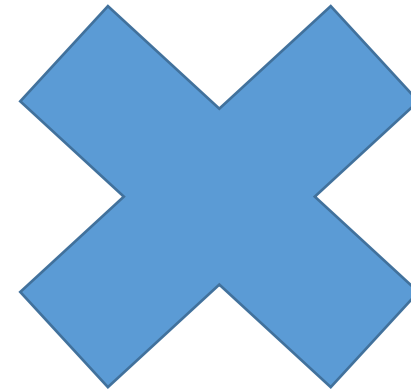
- The basic componenet – display a window!



Buffer



Not display yet!



Hello to Allegro

- The basic componenet – display a window!

include

Init

Display

Destroy

```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

```
void game_begin() {
    al_clear_to_color( al_map_rgb(255, 0, 0) );
    al_flip_display();
}
```

Display the result

Hello to Allegro

- The basic component – display a window!



Buffer



`al_flip_display()`



Hello to Allegro

- The basic component – display a window!



```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

Stop the program for 5 seconds so
the window you create will stay
for 5 seconds

Hello to Allegro

- The basic component – display a window!

include

Init

Display

Destroy

```
#include <stdio.h>
#include <allegro5/allegro.h>
ALLEGRO_DISPLAY* display = NULL;
int main(int argc, char *argv[]) {
    game_init();
    game_begin();
    al_rest(5);
    game_destroy();
    return 0;
}
```

```
void game_destroy() {
    al_destroy_display(display);
}
```

Release the memory of
the variable

The background is a vibrant, abstract composition. It features a large, irregular white shape in the center, surrounded by various colored organic shapes. There are large grey circles in the top-left and bottom-right, a large blue shape in the top-center, a large yellow pill-shaped shape on the right, and a large orange circle in the bottom-right. Smaller circles and dots in shades of blue, green, and black are scattered throughout the composition.

Practice

Finish task 1!!



Outline

01

Introduction

02

Draw something!

03

Deal with event !

04

Play some music!

05

Supplementary

Draw text

- Draw some text on the window



Draw text

- Draw some text on the window



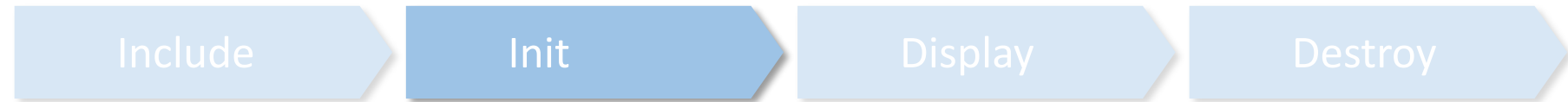
```
#include <allegro5/allegro_font.h>  
#include <allegro5/allegro_ttf.h>
```



Head file of font and ttf(字體)

Draw text

- Draw some text on the window



```
void game_init() {  
    al_init()  
    display = al_create_display(width, height);  
    al_set_window_position(display, 0, 0);  
    al_init_font_addon();  
    al_init_ttf_addon();  
}
```

initialize file of font and ttf(字體)

Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255,255,255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

Load the font

Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255, 255, 255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

→ The path of the font file

Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255, 255, 255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

→ The size of the font

Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255,255,255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

Usually 0, but you can put other two flags:

1. ALLEGRO_TTF_NO_KERNING: not use any kerning(間距調整)
2. ALLEGRO_TTF_MONOCHROME: Load as a monochrome font (Which means no anti-aliasing of the font is done)
3. Eg: `al_load_ttf_font("pirulen.ttf", 50, ALLEGRO_TTF_NO_KERNING);`

Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255,255,255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

Draw text into buffer

Draw text

- Draw some text on the window

Include

Init

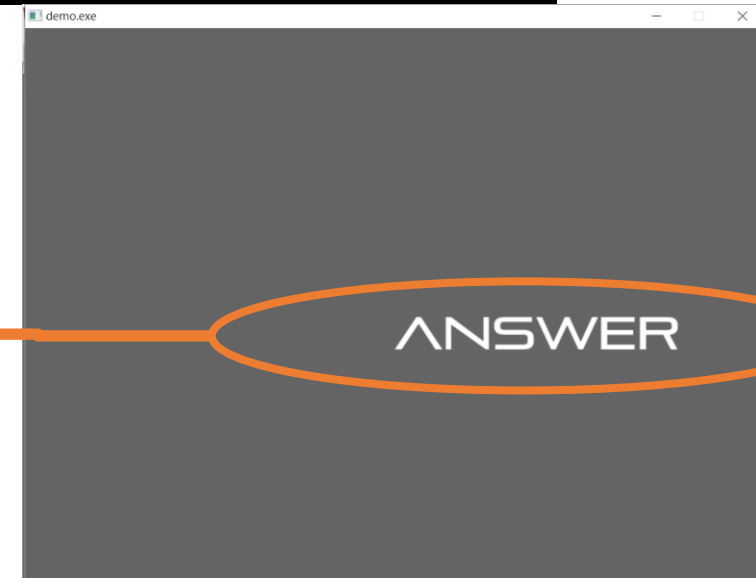
Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255, 255, 255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

Set the color of text

Color white



Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255, 255, 255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

The position of the text

Position (width/2, height/2)



Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255, 255, 255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

You can put three different flags here:

1. ALLEGRO_ALIGN_LEFT: text align-left(you can use 0 instead)
2. ALLEGRO_ALIGN_CENTRE: text align-center
3. ALLEGRO_ALIGN_RIGHT: text align-right

Draw text

- Draw some text on the window

Include

Init

Display

Destroy

Text align-right



Text align-center



Text align-left



Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_begin() {  
    al_clear_to_color( al_map_rgb(100, 100, 100) );  
    font = al_load_ttf_font("pirulen.ttf", 50, 0);  
    al_draw_text(font, al_map_rgb(255,255,255), width/2, height/2, 0, "answer");  
    al_flip_display();  
}
```

The text you want to show

Draw text

- Draw some text on the window

Include

Init

Display

Destroy

```
void game_destroy() {  
    al_destroy_display(display);  
    al_destroy_font(font);  
}
```

Release the memory of font

Draw rectangle

- Draw rectangle on the window



Draw rectangle

- Draw rectangle on the window

Include

Init

Display

Destroy

```
#include <allegro5/allegro_primitives.h>
```

Include the head file can draw some basic things

Draw rectangle

- Draw rectangle on the window



```
al_init_primitives_addon();
```



Initialize primitive functions

Draw rectangle

- Draw rectangle on the window

Include

Init

Display

Destroy

```
al_draw_rectangle(width-300, height-50, width, height, al_map_rgb(255,255,255), 2);
```

Draw a hollow rectangle

Draw rectangle

- Draw rectangle on the window

Include

Init

Display

Destroy

```
al_draw_rectangle(width-300, height-50, width, height, al_map_rgb(255,255,255), 2);
```

The position of the up left corner of rectangle



Draw rectangle

- Draw rectangle on the window

Include

Init

Display

Destroy

```
al_draw_rectangle(width-300, height-50, width, height, al_map_rgb(255,255,255), 2);
```

The position of the down right corner of rectangle



Draw rectangle

- Draw rectangle on the window

Include

Init

Display

Destroy

```
al_draw_rectangle(width-300, height-50, width, height, al_map_rgb(255,255,255), 2);
```

The color of the rectangle

Color white



Draw rectangle

- Draw rectangle on the window

Include

Init

Display

Destroy

```
al_draw_rectangle(width-300, height-50, width, height, al_map_rgb(255,255,255), 2);
```

The width of edges of the rectangle

The width of edges of the rectangle is 2

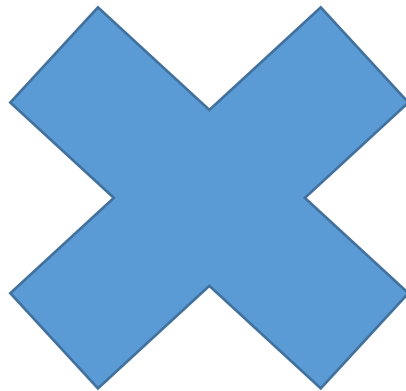


Draw rectangle

- Draw rectangle on the window



No need to destroy



Draw picture

- Draw picture on the window



Draw picture

- Draw picture on the window



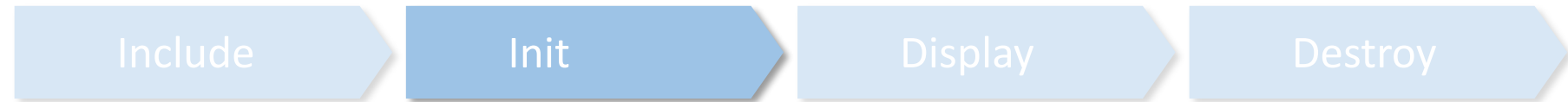
```
#include <allegro5/allegro_image.h>
```



Include the head file can draw picture on the window

Draw picture

- Draw picture on the window



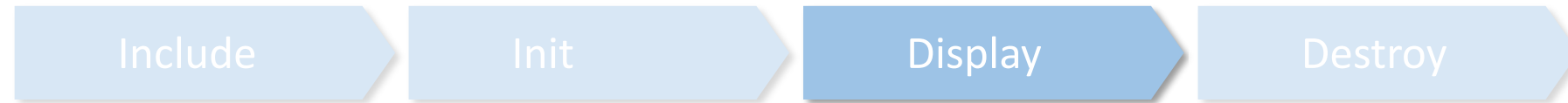
```
al_init_image_addon();
```



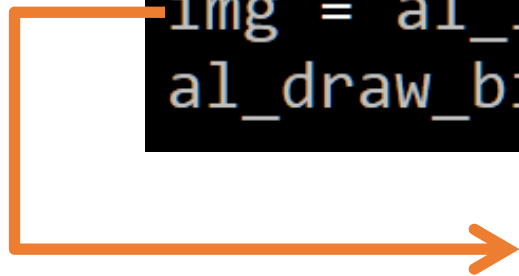
Initialize the image function

Draw picture

- Draw picture on the window



```
img = al_load_bitmap("htchen.jpg");  
al_draw_bitmap(img, 0, 0, 0);
```



Store the image in to variable "img"

img:



Draw picture

- Draw picture on the window

Include

Init

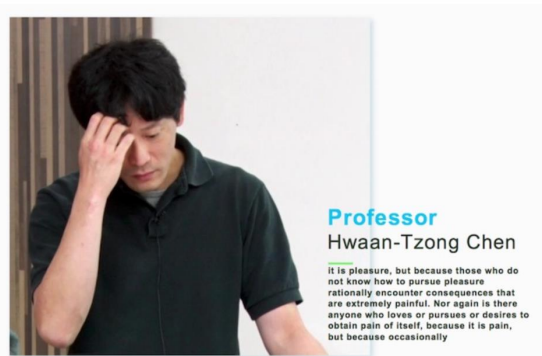
Display

Destroy

```
img = al_load_bitmap("htchen.jpg");  
al_draw_bitmap(img, 0, 0, 0);
```

Draw the image into buffer

img:



buffer:



Use `al_flip_display()`,
to show the image
on the window

Draw picture

- Draw picture on the window

Include

Init

Display

Destroy

```
img = al_load_bitmap("htchen.jpg");  
al_draw_bitmap(img, 0, 0, 0);
```

The position of the up left corner of the image



Draw picture

- Draw picture on the window



```
img = al_load_bitmap("htchen.jpg");  
al_draw_bitmap(img, 0, 0, 0);
```

Usually 0, but you can put other two flags:

1. ALLEGRO_FLIP_HORIZONTAL: flip the image horizontally
2. ALLEGRO_FLIP_VERTICAL: flip the image vertically



Draw picture

- Draw picture on the window

Include

Init

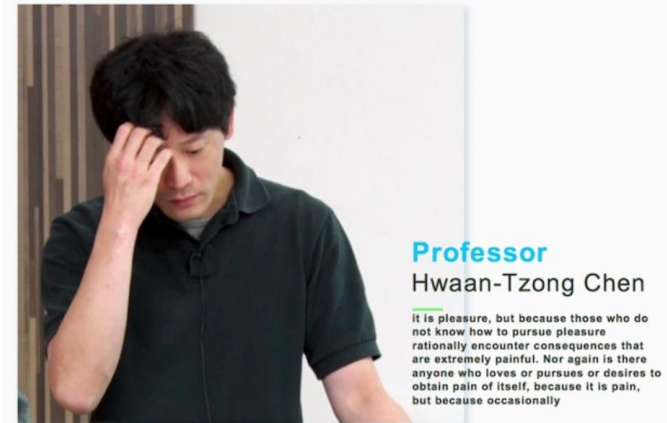
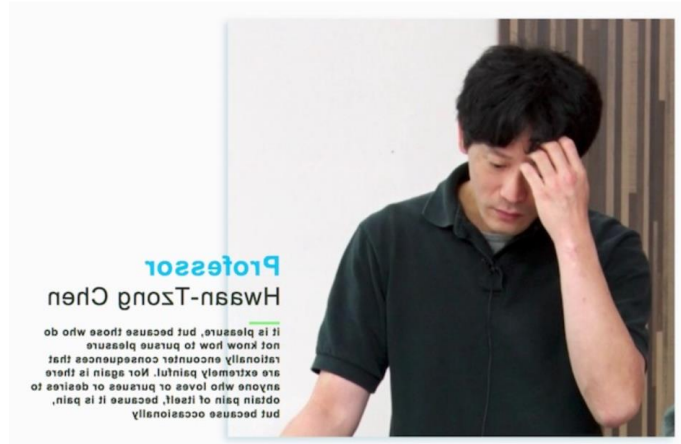
Display

Destroy

ALLEGRO_FLIP_HORIZONTAL

0

ALLEGRO_FLIP_VERTICAL



Draw picture

- Draw picture on the window



```
al_destroy_bitmap(img);
```



Release the memory of the image

The background is a vibrant, abstract composition. It features a large, irregular white shape in the center, surrounded by various organic, blob-like shapes in shades of green, blue, yellow, orange, and grey. The shapes vary in size and color, creating a dynamic and modern aesthetic.

Practice

Finish task 2!!



Outline

01

Introduction

02

Draw something!

03

Deal with event !

04

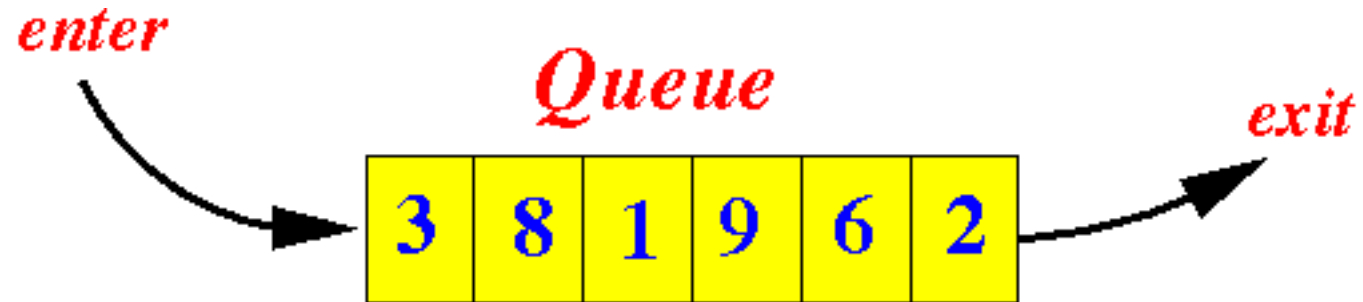
Play some music!

05

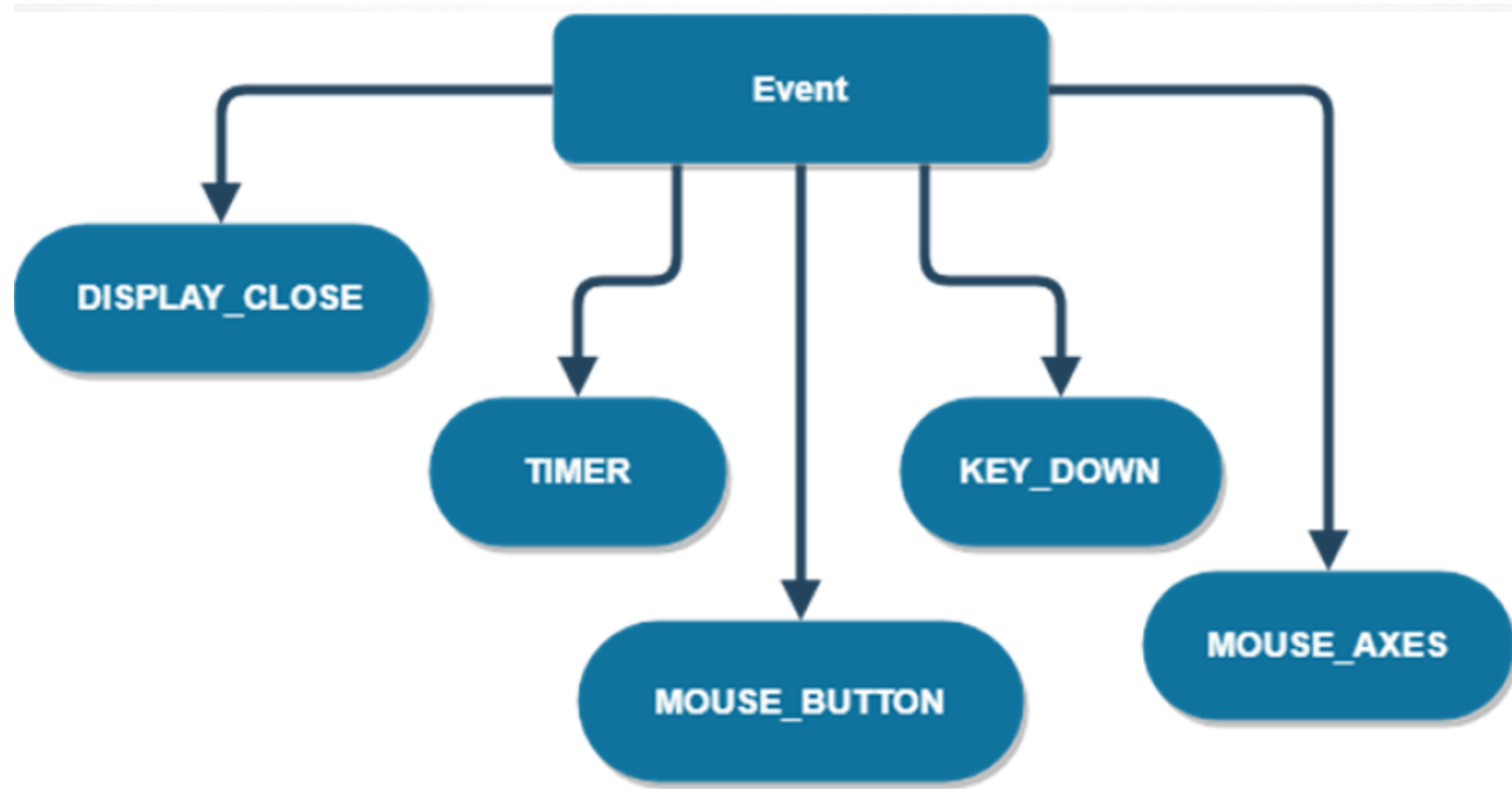
Supplementary

queue

The one that enters the queue first will also exit first (because he/she gets serviced first)

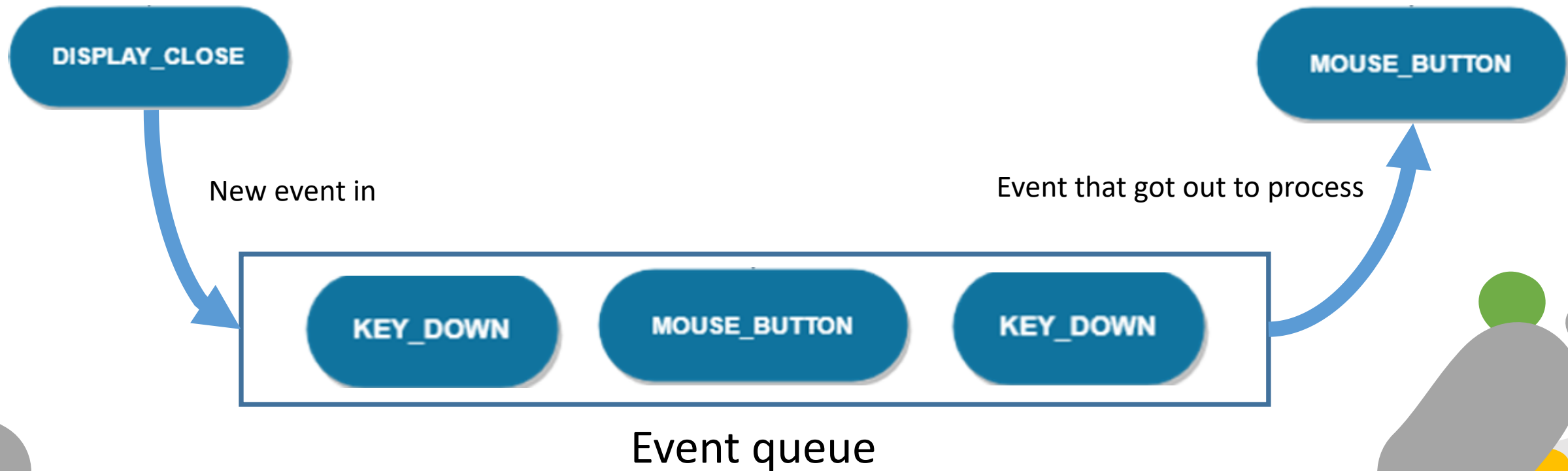


Type of event



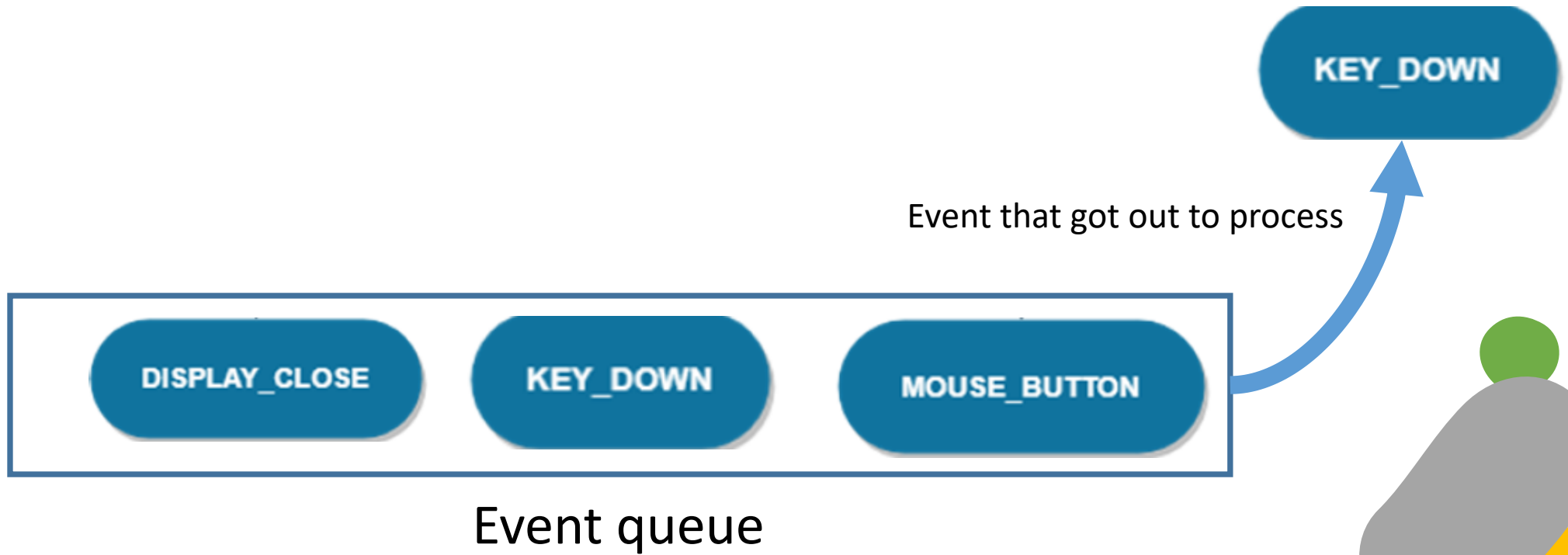
Event queue

A queue that store event



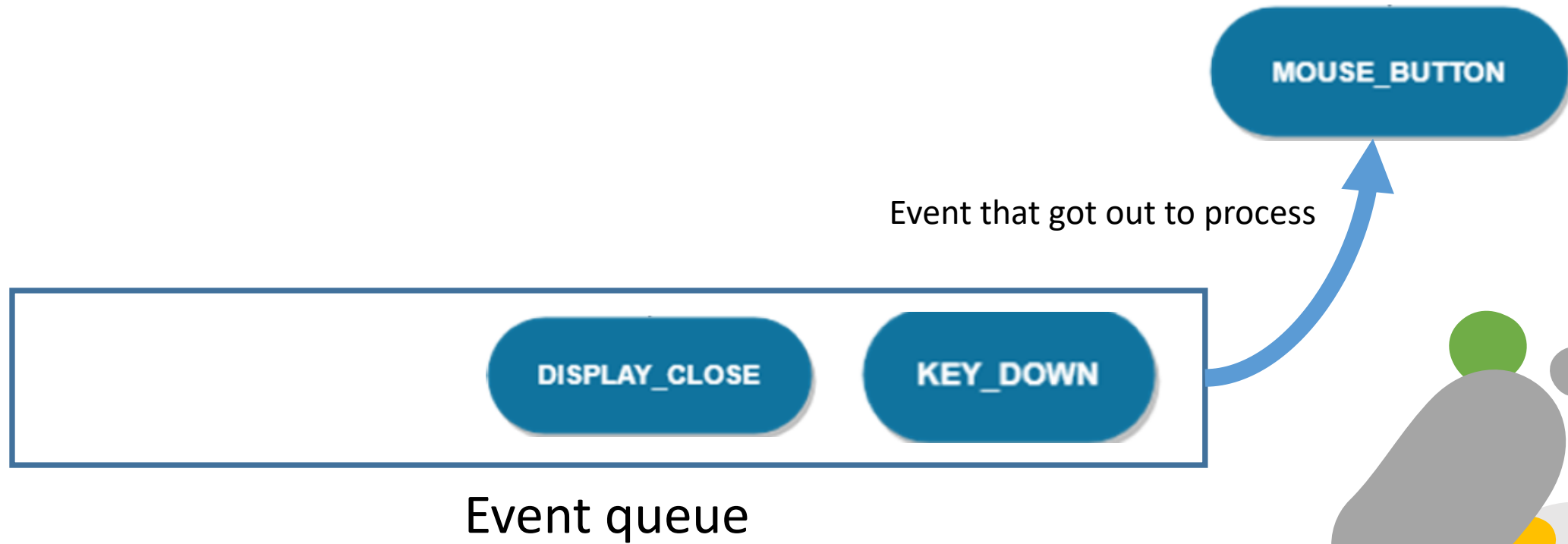
Event queue

A queue that store event



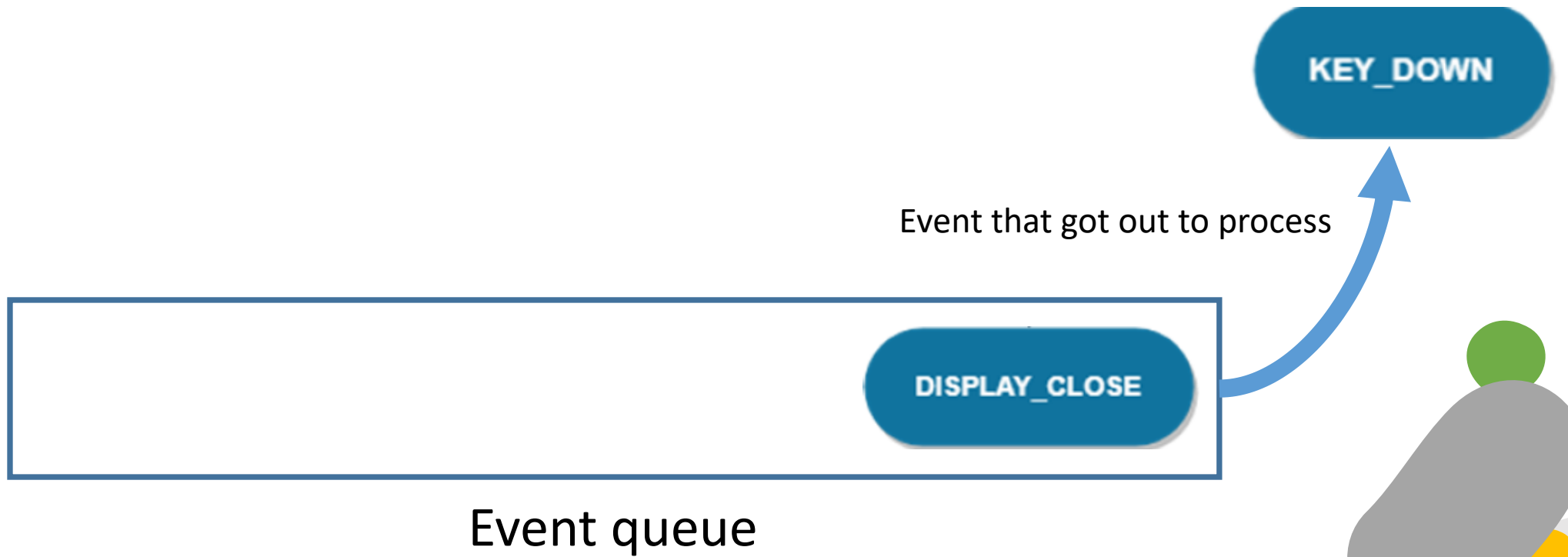
Event queue

A queue that store event



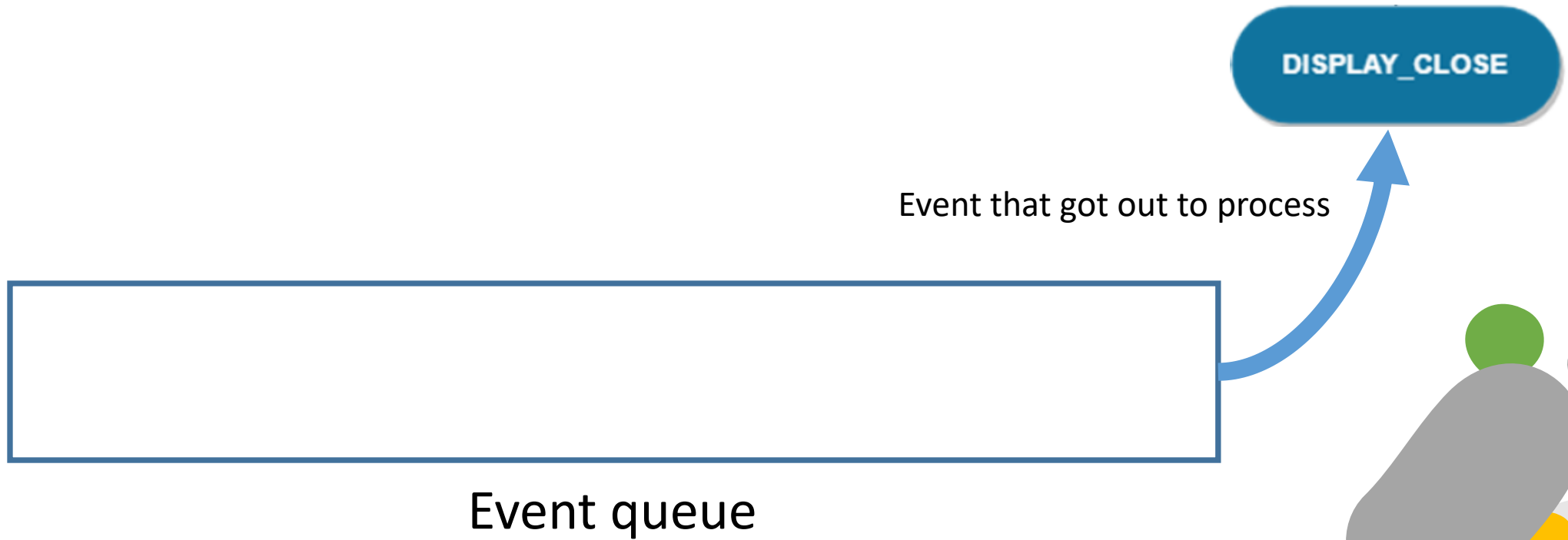
Event queue

A queue that store event



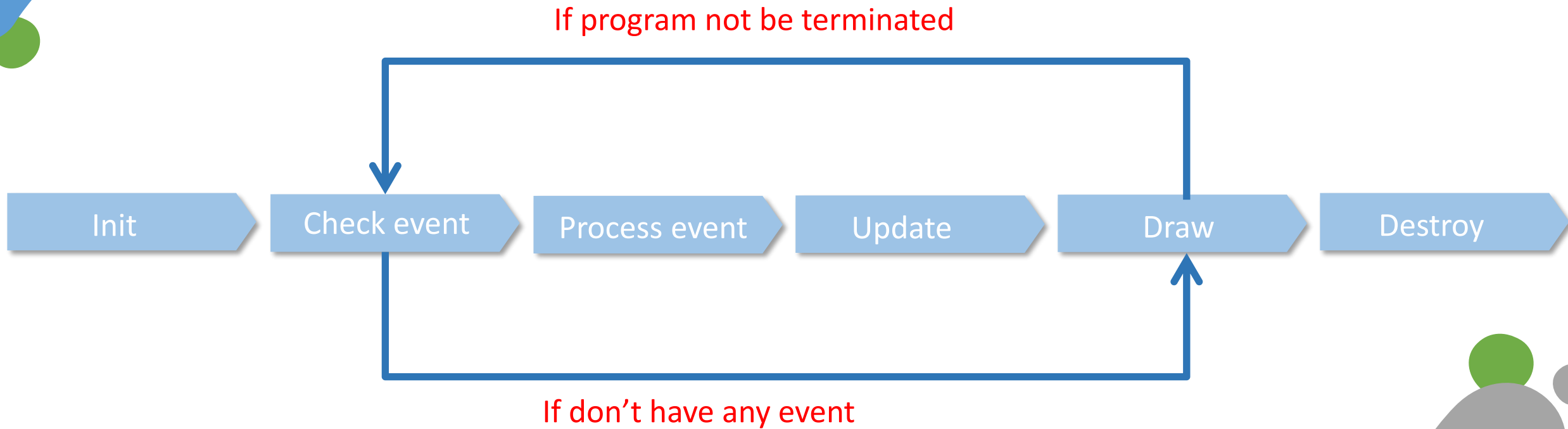
Event queue

A queue that store event

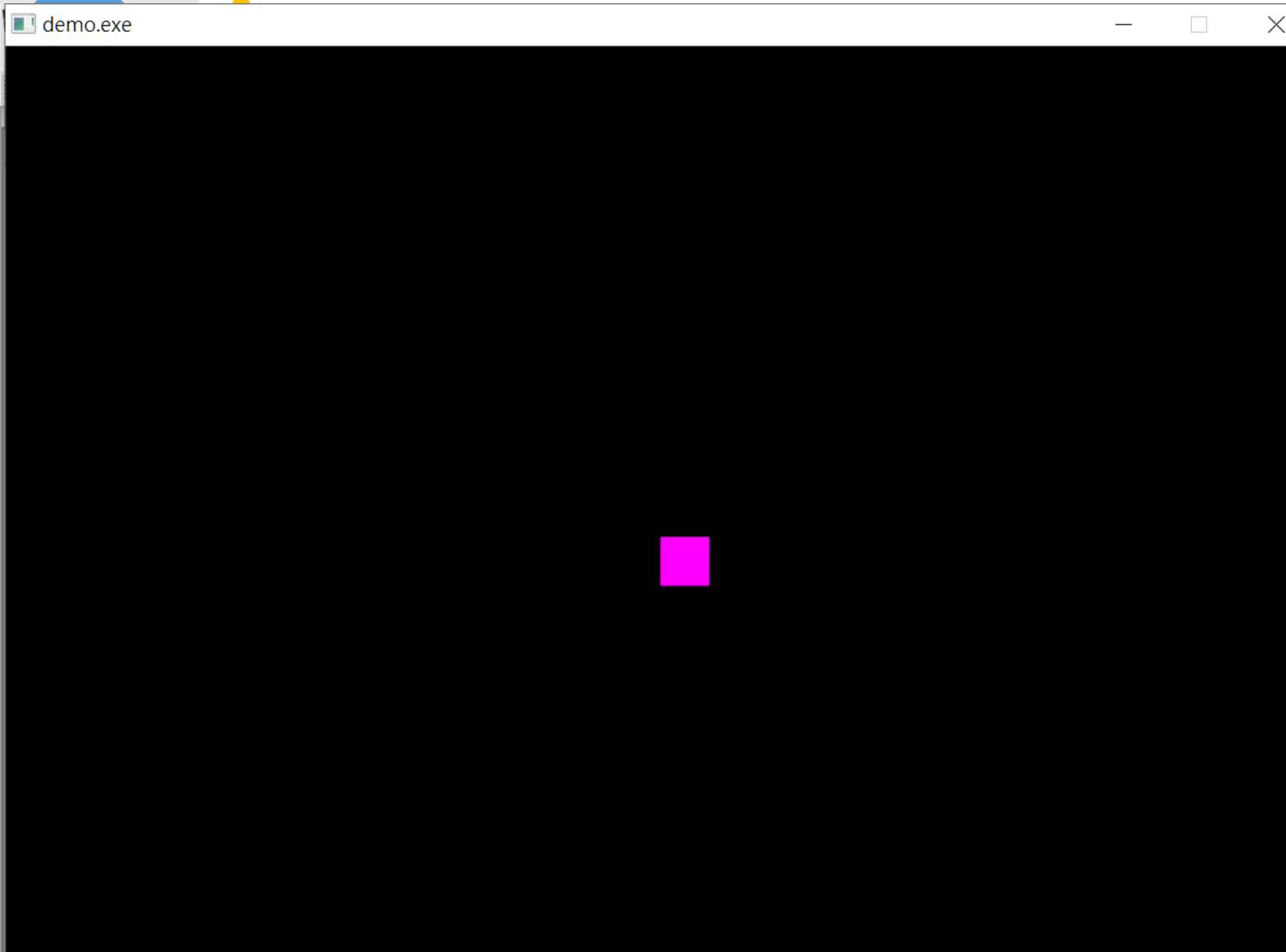


event

The process flow of event



event



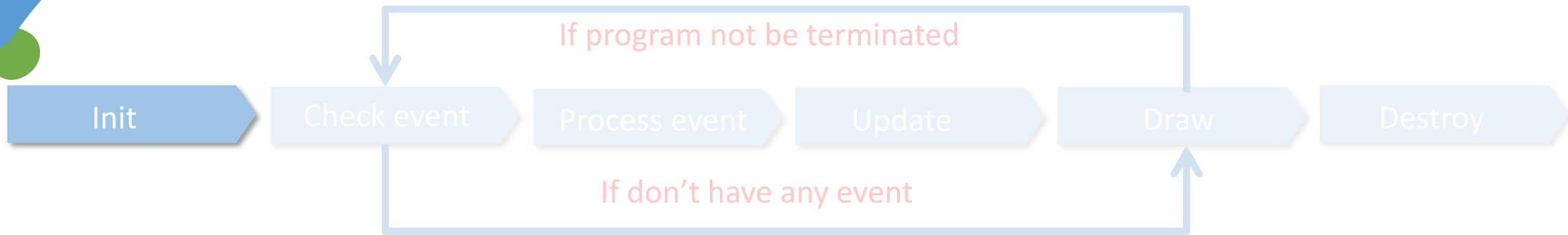
Take a program that you can move the rectangle around as example.

Use “WASD” to control the movement of rectangle.

Pressed “ESC” to terminate the program.

event

The process flow of event

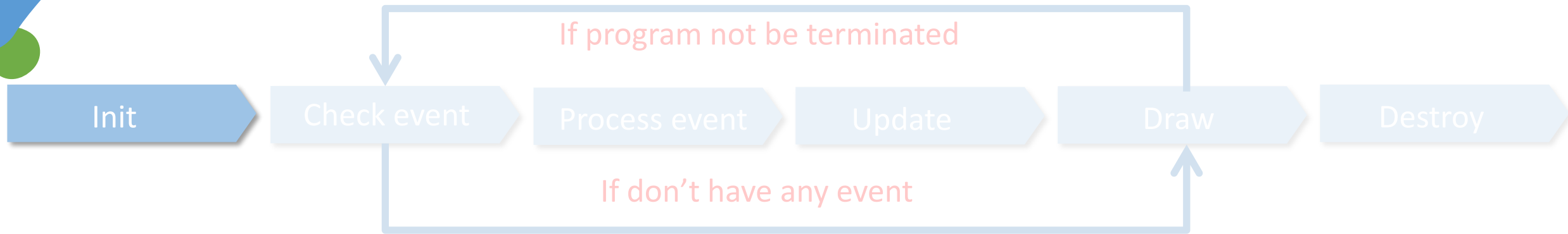


```
int main(int argc, char *argv[]) {  
    int msg = 0;  
    game_init();  
    while (msg != GAME_TERMINATE) {  
        msg = game_run();  
    }  
    game_destroy();  
    return 0;  
}
```

```
event_queue = al_create_event_queue();  
al_install_keyboard();  
al_register_event_source(event_queue, al_get_keyboard_event_source());
```

event

The process flow of event



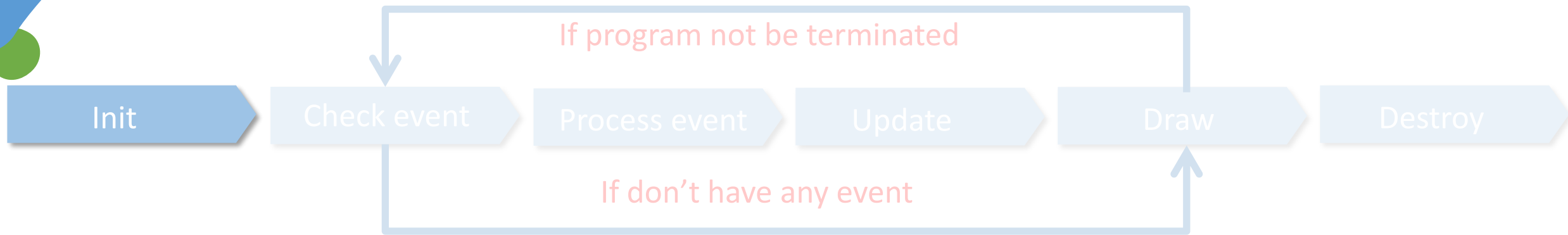
```
int main(int argc, char *argv[]) {  
    int msg = 0;  
    game_init();  
    while (msg != GAME_TERMINATE) {  
        msg = game_run();  
    }  
    game_destroy();  
    return 0;  
}
```

```
event_queue = al_create_event_queue();  
al_install_keyboard();  
al_register_event_source(event_queue, al_get_keyboard_event_source());
```

Create event queue

event

The process flow of event



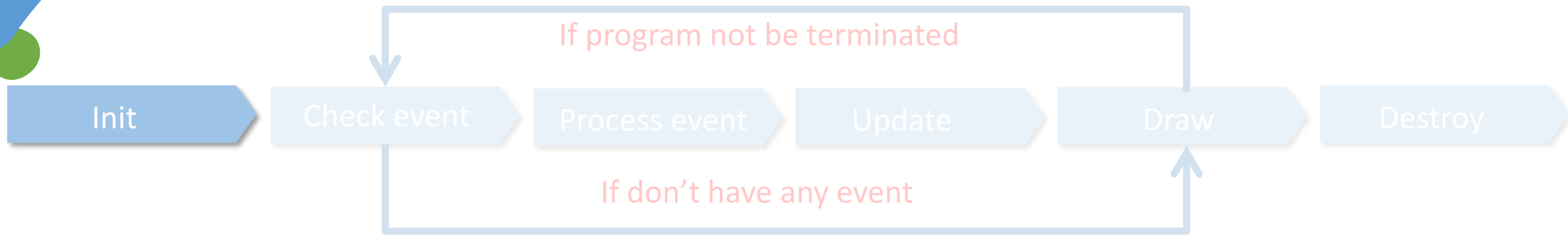
```
int main(int argc, char *argv[]) {  
    int msg = 0;  
    game_init();  
    while (msg != GAME_TERMINATE) {  
        msg = game_run();  
    }  
    game_destroy();  
    return 0;  
}
```

```
event_queue = al_create_event_queue();  
al_install_keyboard();  
al_register_event_source(event_queue, al_get_keyboard_event_source());
```

Install keyboard

event

The process flow of event



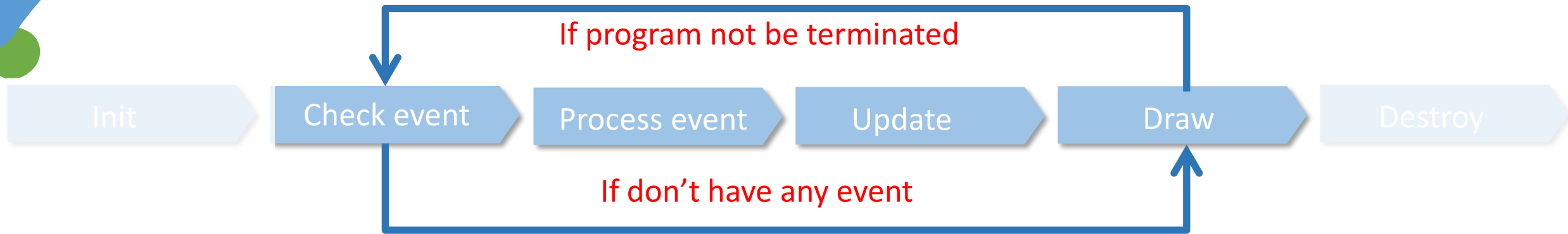
```
int main(int argc, char *argv[]) {  
    int msg = 0;  
    game_init();  
    while (msg != GAME_TERMINATE) {  
        msg = game_run();  
    }  
    game_destroy();  
    return 0;  
}
```

```
event_queue = al_create_event_queue();  
al_install_keyboard();  
al_register_event_source(event_queue, al_get_keyboard_event_source());
```

Register keyboard event by using
`al_register_event_source()`,
get the keyboard event source by using
`al_get_keyboard_event_source()`

event

The process flow of event

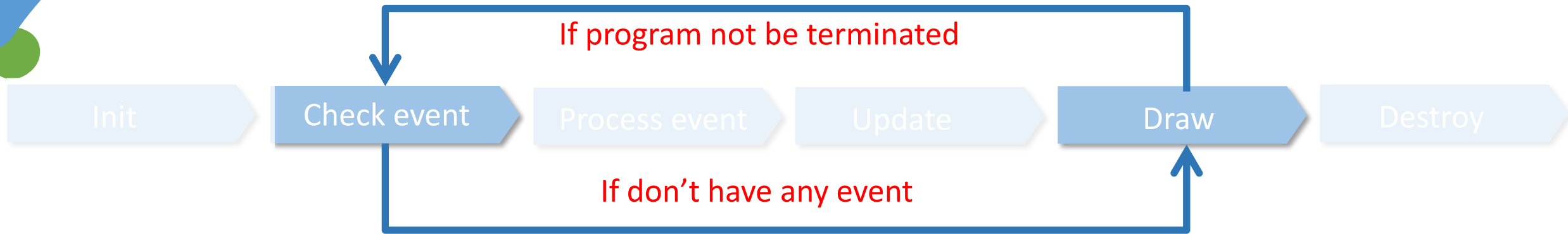


```
int main(int argc, char *argv[]) {  
    int msg = 0;  
    game_init();  
    while (msg != GAME_TERMINATE) {  
        msg = game_run();  
    }  
    game_destroy();  
    return 0;  
}
```

The loop that process the event

event

The process flow of event



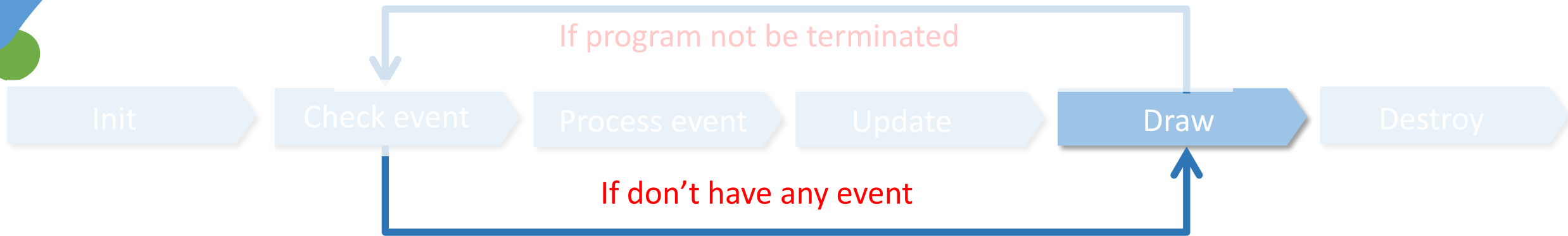
```
int game_run() {  
    int error = 0;  
    if (!al_is_event_queue_empty(event_queue)) {  
        error = process_event();  
    }  
    game_draw();  
    return error;  
}
```

Bool

`al_is_event_queue_empty(ALLEGRO_EVENT_QUEUE *)` is a bool function that check if there is any event in the event queue.

event

The process flow of event

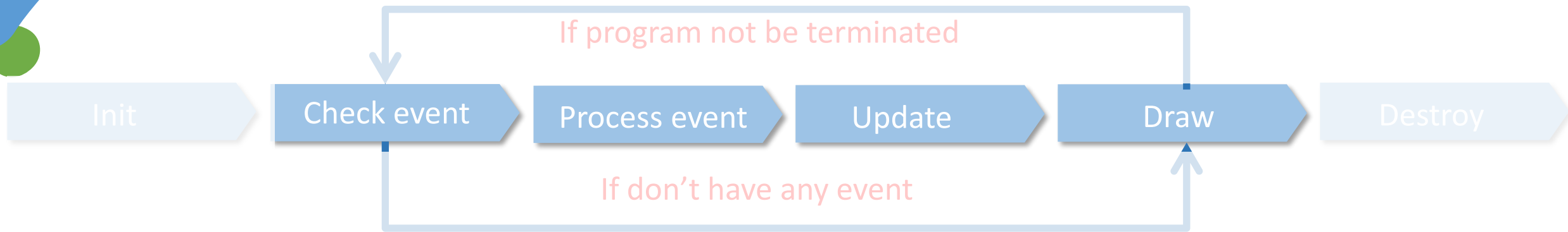


```
int game_run() {  
    int error = 0;  
    if (!al_is_event_queue_empty(event_queue)) {  
        error = process_event();  
    }  
    game_draw();  
    return error;  
}
```

→ If there doesn't exist any event then draw what you have

event

The process flow of event

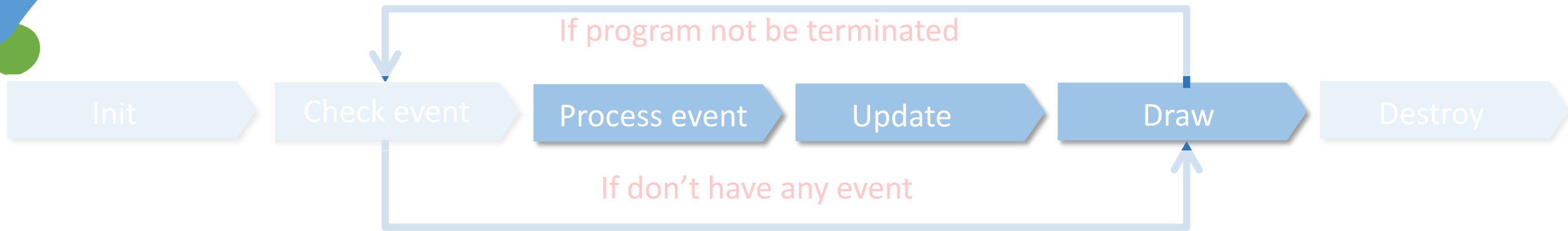


```
int game_run() {  
    int error = 0;  
    if (!al_is_event_queue_empty(event_queue)) {  
        error = process_event();  
    }  
    game_draw();  
    return error;  
}
```

If there' exists some event in the event queue, then process the event

event

The process flow of event



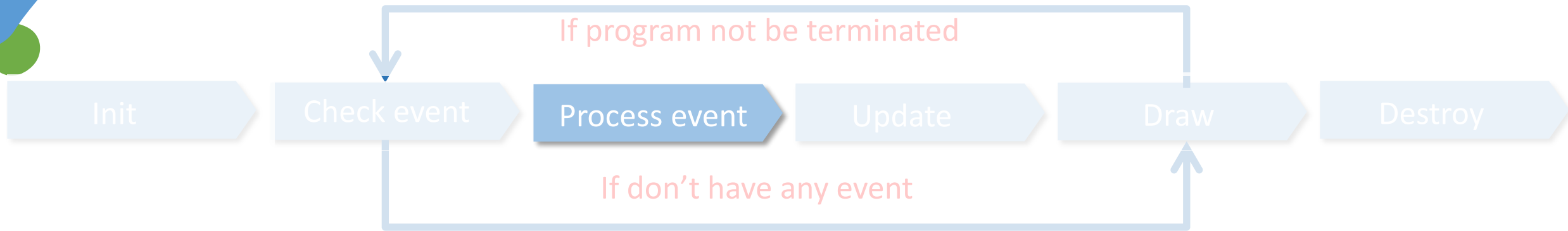
```
int process_event() {  
    al_wait_for_event(event_queue, &event);  
    keyboard_event();  
    int error = game_update();  
    game_draw();  
    return error;  
}
```

Use
`void al_wait_for_event(ALLEGRO_EVENT_QUEUE *queue,
ALLEGRO_EVENT *ret_event)` to get the event

Your program will stop and wait for event.

event

The process flow of event

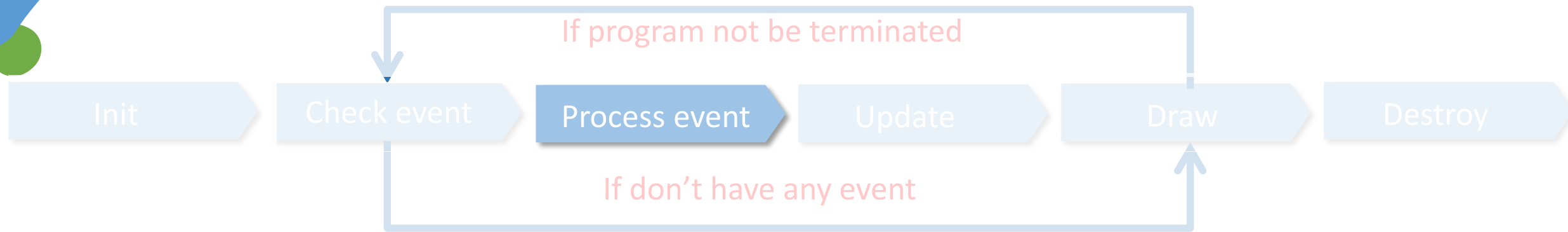


```
int process_event() {  
    al_wait_for_event(event_queue, &event);  
    keyboard_event();  
    int error = game_update();  
    game_draw();  
    return error;  
}
```

Process keyboard event

event

The process flow of event

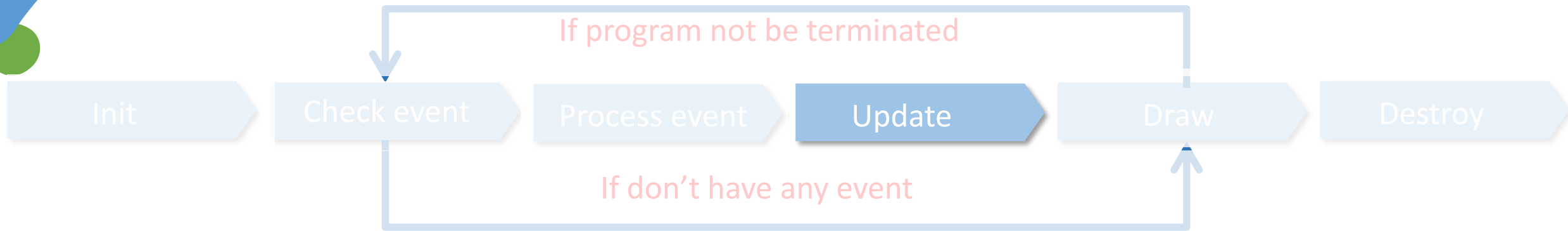


```
bool key_state[ALLEGRO_KEY_MAX];
int keyboard_event(){
    if( event.type == ALLEGRO_EVENT_KEY_DOWN ){
        key_state[event.keyboard.keycode] = true;
    }else if( event.type == ALLEGRO_EVENT_KEY_UP ){
        key_state[event.keyboard.keycode] = false;
    }
    return 0;
}
```

1. Declare a global array "key_state" to determine the state of certain key. If the state is false means the key is being pressed, otherwise not being pressed
2. "event.type" can get the type of event
3. "event.keyboard.keycode" can get which key cause the event

event

The process flow of event

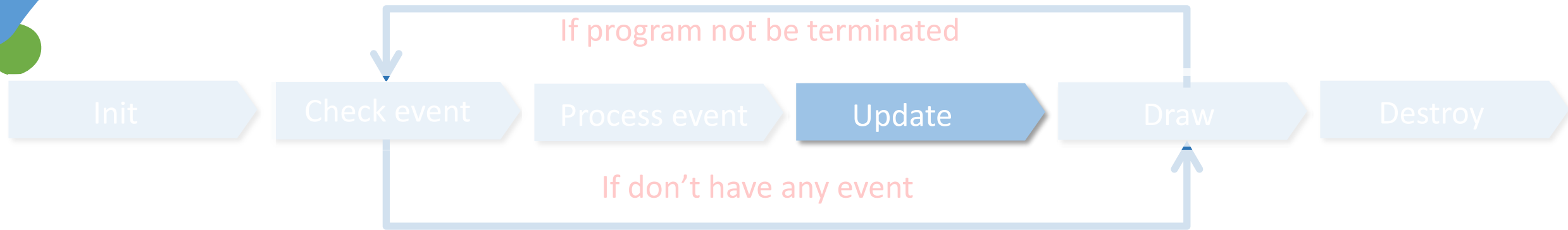


```
int process_event() {  
    al_wait_for_event(event_queue, &event);  
    keyboard_event();  
    int error = game_update();  
    game_draw();  
    return error;  
}
```

Update variables depend on the event

event

The process flow of event

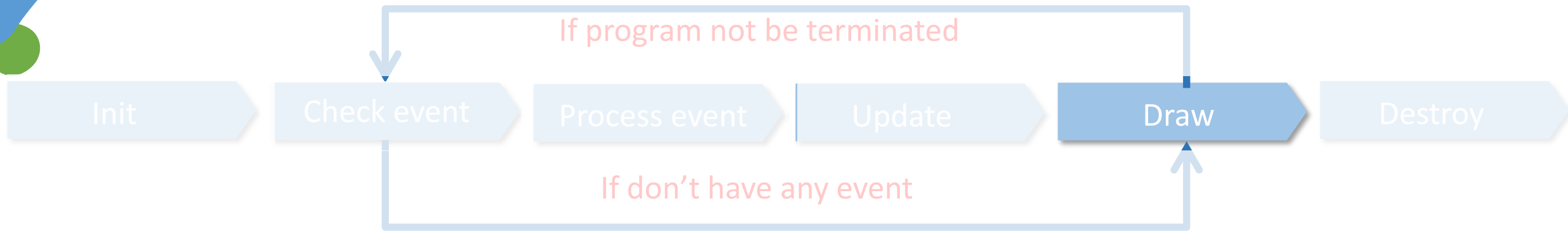


```
int game_update(){
    if( key_state[ALLEGRO_KEY_W] ){
        pos_y -= 10;
    }else if( key_state[ALLEGRO_KEY_A] ){
        pos_x -= 10;
    }else if( key_state[ALLEGRO_KEY_S] ){
        pos_y += 10;
    }else if( key_state[ALLEGRO_KEY_D] ){
        pos_x += 10;
    }else if( key_state[ALLEGRO_KEY_ESCAPE] ){
        return GAME_TERMINATE;
    }
    return 0;
}
```

Update the position of rectangle base on which key is being pressed.

event

The process flow of event

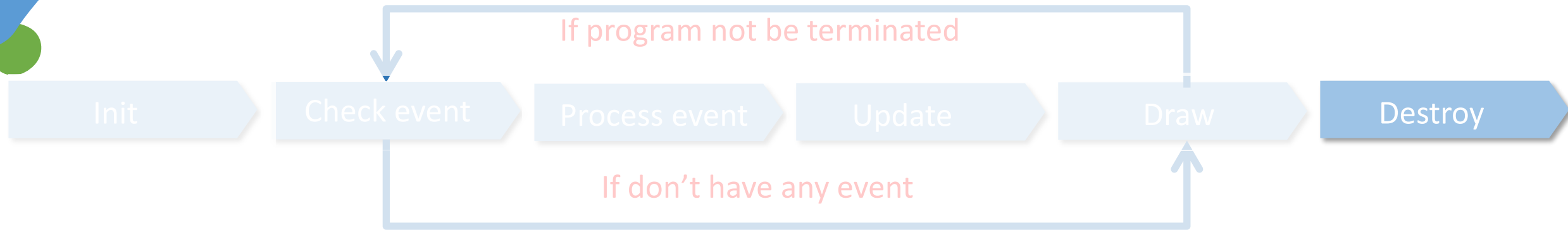


```
int process_event() {  
    al_wait_for_event(event_queue, &event);  
    keyboard_event();  
    int error = game_update();  
    game_draw();  
    return error;  
}
```

Draw what you want

event

The process flow of event

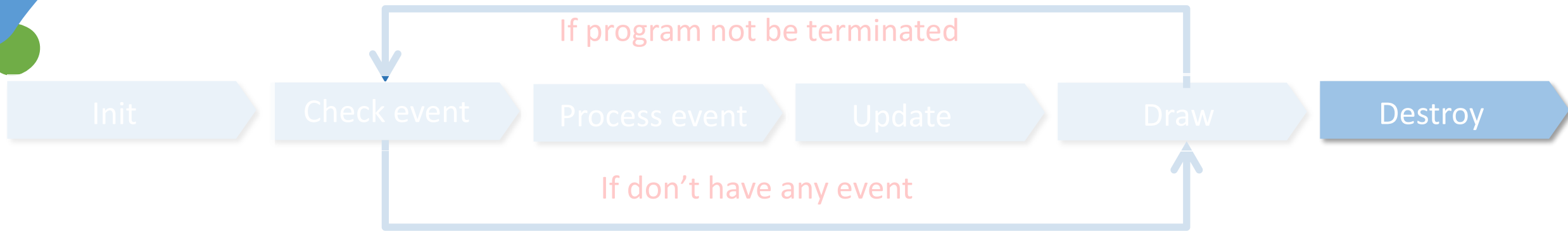


```
al_destroy_event_queue(event_queue);
```

→ Destroy event queue

event

The process flow of event



```
al_destroy_event_queue(event_queue);
```

→ Destroy event queue



Outline

01

Introduction

02

Draw something!

03

Deal with event !

04

Play some music!

05

Supplementary

Display sound



Display sound

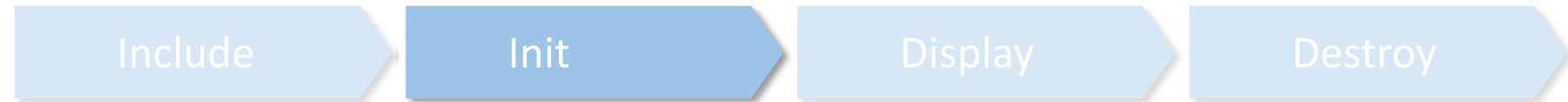


```
#include <allegro5/allegro_audio.h>  
#include <allegro5/allegro_acodec.h>
```



Include the head file can display sound

Display sound



```
al_init_acodec_addon();
```



Initialize audio addon

Display sound

Include

Init

Display

Destroy

```
sample = al_load_sample("growl.wav");  
startSound = al_create_sample_instance(sample);  
al_set_sample_instance_playmode(startSound, ALLEGRO_PLAYMODE_ONCE);  
al_attach_sample_instance_to_mixer(startSound, al_get_default_mixer());  
al_play_sample_instance(startSound);
```

Load the sound instance

Display sound

Include

Init

Display

Destroy

```
sample = al_load_sample("growl.wav");  
startSound = al_create_sample_instance(sample);  
al_set_sample_instance_playmode(startSound, ALLEGRO_PLAYMODE_ONCE);  
al_attach_sample_instance_to_mixer(startSound, al_get_default_mixer());  
al_play_sample_instance(startSound);
```

Create a sound instance so that it
can be attach into mixer

Display sound

Include

Init

Display

Destroy

```
sample = al_load_sample("growl.wav");  
startSound = al_create_sample_instance(sample);  
al_set_sample_instance_playmode(startSound, ALLEGRO_PLAYMODE_ONCE);  
al_attach_sample_instance_to_mixer(startSound, al_get_default_mixer());  
al_play_sample_instance(startSound);
```

Set the play mode, you can use:
ALLEGRO_PLAYMODE_ONCE
ALLEGRO_PLAYMODE_LOOP

Display sound

Include

Init

Display

Destroy

```
sample = al_load_sample("growl.wav");  
startSound = al_create_sample_instance(sample);  
al_set_sample_instance_playmode(startSound, ALLEGRO_PLAYMODE_ONCE);  
al_attach_sample_instance_to_mixer(startSound, al_get_default_mixer());  
al_play_sample_instance(startSound);
```

Attach the sound into mixer so that it
can be played with multiple sound

Display sound

Include

Init

Display

Destroy

```
sample = al_load_sample("growl.wav");  
startSound = al_create_sample_instance(sample);  
al_set_sample_instance_playmode(startSound, ALLEGRO_PLAYMODE_ONCE);  
al_attach_sample_instance_to_mixer(startSound, al_get_default_mixer());  
al_play_sample_instance(startSound);
```

Play the sample.

Display sound



```
al_stop_sample_instance(startSound);
```



You can use this function to stop the sample

Display sound

Include

Init

Display

Destroy

You can use this function to control the volume

```
al_set_sample_instance_gain(startSound, 1);
```

Display sound



```
al_destroy_sample_instance(startSound);
```



Destroy the sample instance



Outline

01

Introduction

02

Draw something!

03

Deal with event !

04

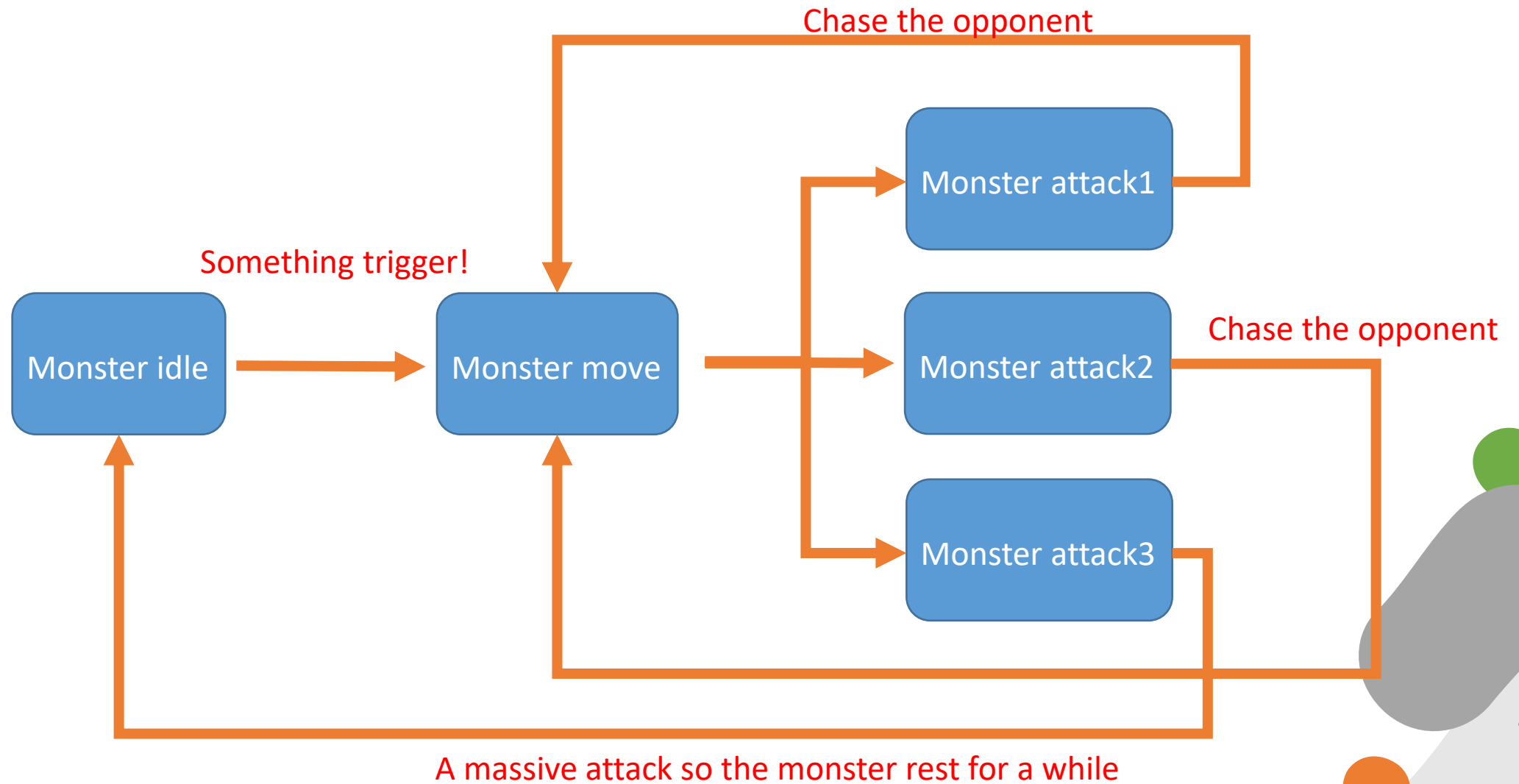
Play some music!

05

Supplementary

AI

~Use finite state machine!!!



AI

~Use finite state machine!!!

Monster idle

Draw the
stop monster

Monster move

Draw the
moving
animation

Monster attack1

Draw the
attack1
animation

Monster attack2

Draw the
attack2
animation

Monster attack3

Draw the
attack3
animation

By using states, we can easy
draw the animation of monster

Special effect sound

~Use finite state machine!!!

Monster idle

Display the
sound of
panting

Monster move

Display the
sound of
moving

Monster attack1

Display the
sound of
attack1

Monster attack2

Display the
sound of
attack2

Monster attack3

Display the
sound of
attack3

Just judge the state then use
`al_play_sample(*ALLEGRO_SAMPLE)`

Display video

- Use something like mp4 to jpg to transfer the video into images.
- Load the images into an array. You can use `sprintf` to manipulate the path of image
- Set a timer as the fps of your video.
- Set a event queue to get the timer event.
- Each time the timer trigger display the image on the screen
- Plus the index of array by 1 to display the next image.
- Then you get the effect of display video!

Display video

- Use allegro video addon!



Display video

- Use allegro video addon!



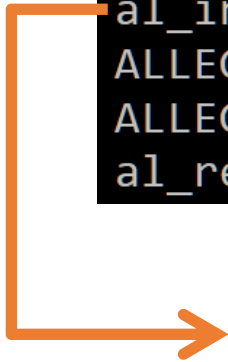
```
#include <allegro5/allegro_audio.h>  
#include <allegro5/allegro_video.h>
```

Display video

- Use allegro video addon!



```
al_init_video_addon();  
ALLEGRO_VIDEO *video = al_open_video(filename);  
ALLEGRO_EVENT_SOURCE *temp = al_get_video_event_source(video);  
al_register_event_source(queue, temp);
```



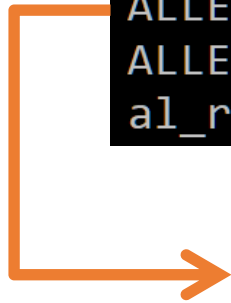
Initialize video addon

Display video

- Use allegro video addon!



```
al_init_video_addon();  
ALLEGRO_VIDEO *video = al_open_video(filename);  
ALLEGRO_EVENT_SOURCE *temp = al_get_video_event_source(video);  
al_register_event_source(queue, temp);
```



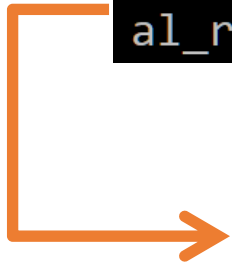
Open the video file
(Note: only “.ogv” type of video is available)

Display video

- Use allegro video addon!



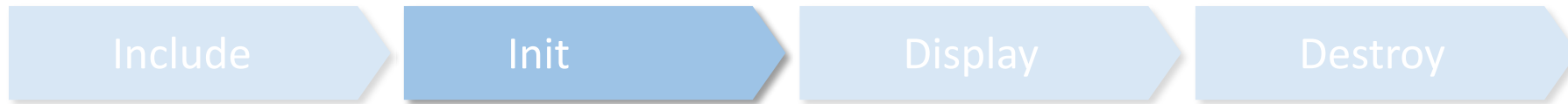
```
al_init_video_addon();  
ALLEGRO_VIDEO *video = al_open_video(filename);  
ALLEGRO_EVENT_SOURCE *temp = al_get_video_event_source(video);  
al_register_event_source(queue, temp);
```



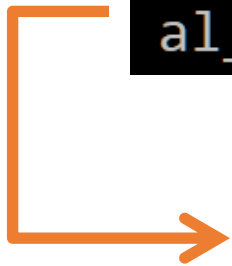
Get the event source of video and register it into event queue.

Display video

- Use allegro video addon!



```
al_reserve_samples(1);  
al_start_video(video, al_get_default_mixer());
```



Reserve the sound channel for video and attach it into default mixer, then the video started

Display video

- Use a loop to display the image of video



```
while(1){
    al_wait_for_event(queue, &event);
    if(event.type == ALLEGRO_EVENT_TIMER) {
        video_display(video);
    } else if( event.type == ALLEGRO_EVENT_DISPLAY_CLOSE ) {
        al_close_video(video);
        break;
    } else if( event.type == ALLEGRO_EVENT_VIDEO_FINISHED ) {
        break;
    }
}
```

→ The FPS of display the frame of video.

Display video

- Use a loop to display the image of video



```
while(1){
    al_wait_for_event(queue, &event);
    if(event.type == ALLEGRO_EVENT_TIMER) {
        video_display(video);
    } else if( event.type == ALLEGRO_EVENT_DISPLAY_CLOSE ) {
        al_close_video(video);
        break;
    } else if( event.type == ALLEGRO_EVENT_VIDEO_FINISHED ) {
        break;
    }
}
```

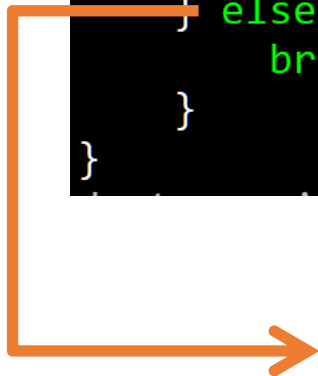
If the display be closed, then close the video and break the loop

Display video

- Use a loop to display the image of video



```
while(1){
    al_wait_for_event(queue, &event);
    if(event.type == ALLEGRO_EVENT_TIMER) {
        video_display(video);
    } else if( event.type == ALLEGRO_EVENT_DISPLAY_CLOSE ) {
        al_close_video(video);
        break;
    } else if( event.type == ALLEGRO_EVENT_VIDEO_FINISHED ) {
        break;
    }
}
```



If the video finished then break the loop

Display video

- Use a loop to display the image of video



```
void video_display(ALLEGRO_VIDEO *video) {  
    ALLEGRO_BITMAP *frame = al_get_video_frame(video);  
    if (!frame)  
        return;  
    al_draw_scaled_bitmap(frame,  
                           0, 0,  
                           al_get_bitmap_width(frame),  
                           al_get_bitmap_height(frame),  
                           0, 0,  
                           al_get_display_width(screen),  
                           al_get_display_height(screen), 0);  
    al_flip_display();  
}
```

Get one frame from the video, frame may be none therefore you should determine the value before draw

Display video

- Use a loop to display the image of video



```
void video_display(ALLEGRO_VIDEO *video) {
    ALLEGRO_BITMAP *frame = al_get_video_frame(video);
    if (!frame)
        return;
    al_draw_scaled_bitmap(frame,
                          0, 0,
                          al_get_bitmap_width(frame),
                          al_get_bitmap_height(frame),
                          0, 0,
                          al_get_display_width(screen),
                          al_get_display_height(screen), 0);
    al_flip_display();
}
```

The position of original bitmap you want to scale

Display video

- Use a loop to display the image of video



```
void video_display(ALLEGRO_VIDEO *video) {
    ALLEGRO_BITMAP *frame = al_get_video_frame(video);
    if (!frame)
        return;
    al_draw_scaled_bitmap(frame,
                          0, 0,
                          al_get_bitmap_width(frame),
                          al_get_bitmap_height(frame),
                          0, 0,
                          al_get_display_width(screen),
                          al_get_display_height(screen), 0);
    al_flip_display();
}
```

The width/height of original bitmap you want to scale

Display video

- Use a loop to display the image of video



```
void video_display(ALLEGRO_VIDEO *video) {
    ALLEGRO_BITMAP *frame = al_get_video_frame(video);
    if (!frame)
        return;
    al_draw_scaled_bitmap(frame,
                          0, 0,
                          al_get_bitmap_width(frame),
                          al_get_bitmap_height(frame),
                          0, 0,
                          al_get_display_width(screen),
                          al_get_display_height(screen), 0);
    al_flip_display();
}
```

The position of the result image on the display



Display video

- Use a loop to display the image of video



```
void video_display(ALLEGRO_VIDEO *video) {
    ALLEGRO_BITMAP *frame = al_get_video_frame(video);
    if (!frame)
        return;
    al_draw_scaled_bitmap(frame,
                          0, 0,
                          al_get_bitmap_width(frame),
                          al_get_bitmap_height(frame),
                          0, 0,
                          al_get_display_width(screen),
                          al_get_display_height(screen), 0);
    al_flip_display();
}
```

The width/height of the result image on the display

Display video

- Use a loop to display the image of video



```
void video_display(ALLEGRO_VIDEO *video) {
    ALLEGRO_BITMAP *frame = al_get_video_frame(video);
    if (!frame)
        return;
    al_draw_scaled_bitmap(frame,
                          0, 0,
                          al_get_bitmap_width(frame),
                          al_get_bitmap_height(frame),
                          0, 0,
                          al_get_display_width(screen),
                          al_get_display_height(screen), 0);
    al_flip_display();
}
```

The same flag of draw bitmap, control the flip

Display video

Include

Init

Display

Destroy

```
al_draw_scaled_bitmap(frame,  
0, 0,  
al_get_bitmap_width(frame),  
al_get_bitmap_height(frame),  
0, 0,  
al_get_display_width(screen),  
al_get_display_height(screen), 0);
```

testing.exe



```
al_draw_scaled_bitmap(frame,  
100, 0,  
al_get_bitmap_width(frame)-100,  
al_get_bitmap_height(frame),  
0, 0,  
al_get_display_width(screen),  
al_get_display_height(screen), 0);
```

testing.exe



Display video



- Close the video will automatically destroy the video.

Display GIF

- This addon is not official
- You need to include the file in your project
- <https://allegro5.org/algif5/>

algif5

About

algif5 is a gif loading library for Allegro 5. [Homepage](#), [Github](#).

Download

[algif5.zip](#)

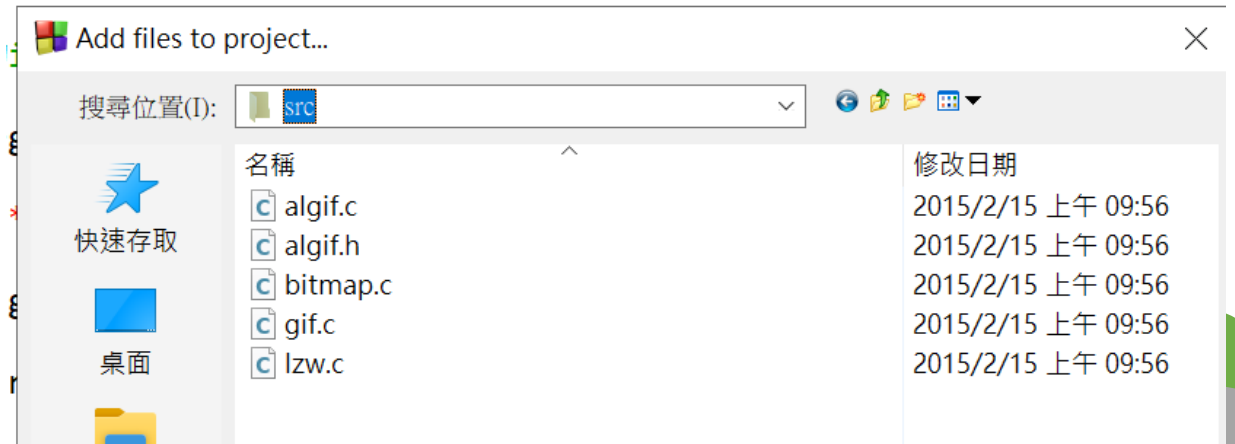
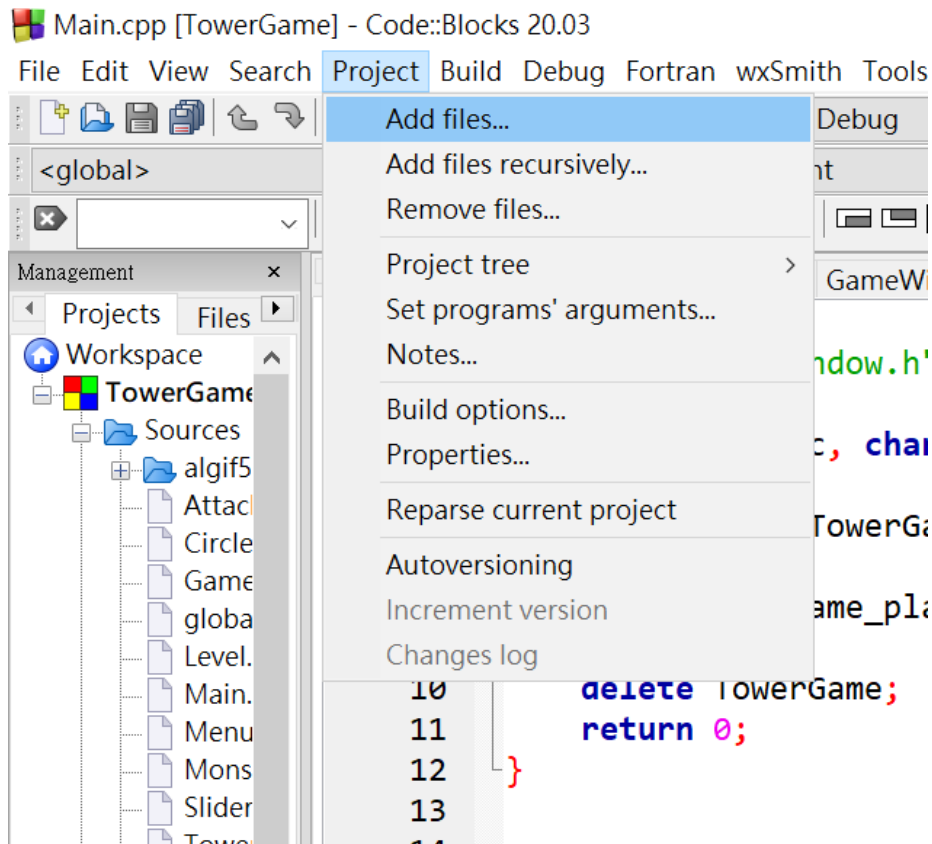
Display GIF

- Download the zip, unzip it and put it into your final project folder

名稱	修改日期	類型	大小
algif5	2015/2/15 上午 09:56	檔案資料夾	
allegro	2021/3/8 下午 06:37	檔案資料夾	
bin	2021/11/22 下午 01:43	檔案資料夾	
BlackDragon	2021/11/22 下午 01:43	檔案資料夾	
CaveMan	2021/11/22 下午 01:43	檔案資料夾	
Claw	2021/11/22 下午 01:43	檔案資料夾	
DemonNijia	2021/11/22 下午 01:43	檔案資料夾	
doxygen	2021/11/22 下午 01:43	檔案資料夾	
Eagle	2021/11/22 下午 01:43	檔案資料夾	
Material	2021/11/22 下午 01:43	檔案資料夾	
obj	2021/11/22 下午 01:43	檔案資料夾	
RedDragon	2021/11/22 下午 01:43	檔案資料夾	
SelectScene	2021/11/22 下午 01:43	檔案資料夾	
SettingScene	2021/11/22 下午 01:43	檔案資料夾	
StartScene	2021/11/22 下午 01:43	檔案資料夾	
Tower	2021/11/22 下午 01:43	檔案資料夾	
Wolf	2021/11/22 下午 01:43	檔案資料夾	
WolfKnight	2021/11/22 下午 01:43	檔案資料夾	
allegro.log	2021/11/22 下午 05:06	文字文件	76 KB
allegro_monolith-5.2.dll	2021/3/8 下午 06:37	應用程式擴充	16,016 KB
allegro_monolith-debug-5.2.dll	2021/3/8 下午 06:37	應用程式擴充	13,604 KB
allegro-5.0.10-monolith-mt.dll	2013/7/7 上午 01:40	應用程式擴充	3,584 KB

Display GIF

- Use add file to include algif5
- Choose all files under algif5/src/



Display GIF



- Use the library of `algif5`!

Display GIF



- Include should have the path to algif.h

```
#include "algif5/src/algif.h"
```


Display GIF



- Simply load the gif by `algif_load_animation()`.
- Make sure the path of your gif is correct.

```
ALGIF_ANIMATION *gif = algif_load_animation("meme.gif");
```

Display GIF



- The original algif lack of the start time variable
- We can declare a gif struct

```
struct GIF{  
    double start_time = 0;  
    ALGIF_ANIMATION *gif = NULL;  
    double get_time(double time) {  
        if(start_time == 0) start_time = time;  
        return time - start_time;  
    }  
} obj;
```

Display GIF



- Use GIF.get_time() to get the actual start time of gif
- al_get_time(): the time(seconds) from the initialization of allegro
- algif_get_bitmap() will return the frame that related to the time

```
ALLEGRO_BITMAP *frame = algif_get_bitmap( obj.gif, obj.get_time( al_get_time() ) );
```

Display GIF



- Use `algif_destroy_animation()` to destroy the gif

```
algif_destroy_animation(obj.gif);
```

A whimsical space-themed illustration featuring a teal rocket ship with a square window and a small flag, positioned to the left of a large orange planet with a ring and three small dots. Two yellow stars are scattered around the central elements. The background is decorated with various colored circles and shapes in shades of orange, teal, and grey.

The End~