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

Outline

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

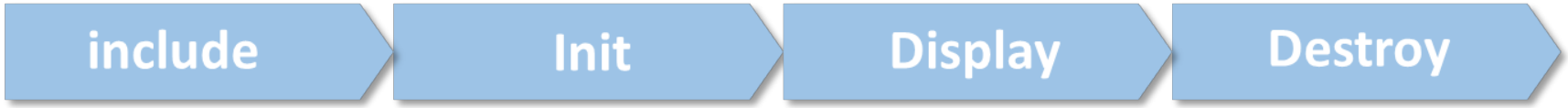
- The functions of allegro

```
#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!



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

```c
#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;
}
```

```c
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 componenet – display a window!

include → Init → Display → Destroy

```c
#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;
}
```

```c
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 componenet – display a window!

include → Init → Display → Destroy

```c
#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;
}
```

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

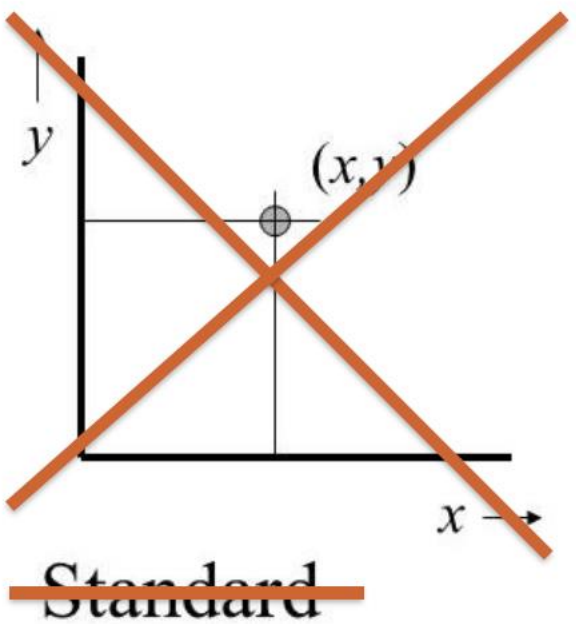
Set the window with position

Hello to Allegro

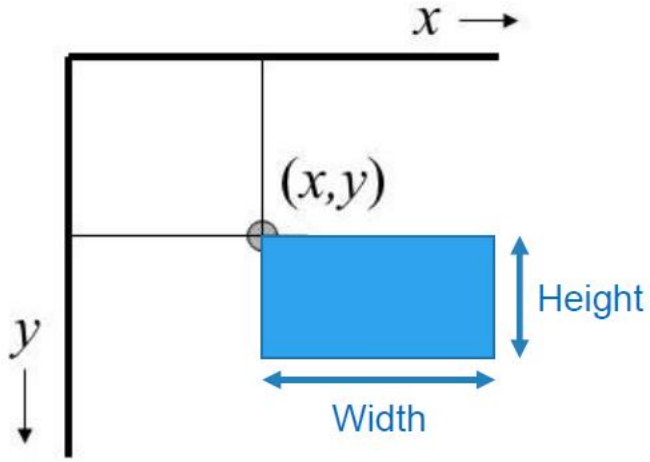
- The basic componenet – display a window!

include | Init | Display | Destroy

Position of window



~~Standard~~



Screen (output, input)

Hello to Allegro

- The basic componenet – display a window!

include → Init → Display → Destroy

```c
#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;
}
```

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

Fill the window with red

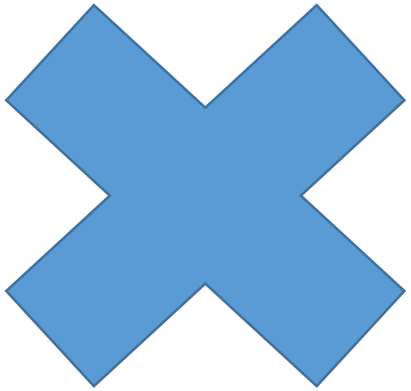
Hello to Allegro

- The basic componenet – display a window!

include → Init → Display → Destroy

Buffer

Not display yet!



Hello to Allegro

- The basic componenet – display a window!

include → Init → Display → Destroy

```c
#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;
}
```

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

Display the result

Hello to Allegro

- The basic componenet – display a window!

include → Init → **Display** → Destroy

Buffer

al_flip_display()

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;
}
```

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

Hello to Allegro

- The basic componenet – display a window!

include → Init → Display → Destroy

```c
#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;
}
```

Release the memory of the variable

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

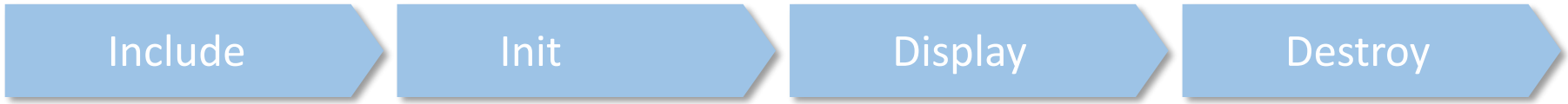
Practice

Finish task 1!!

Outline

Draw text

- Draw some text on the window



Draw text

- Draw some text on the window

Include → Init → Display → Destroy

```
#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

Include → Init → Display → Destroy

```
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();
}
```

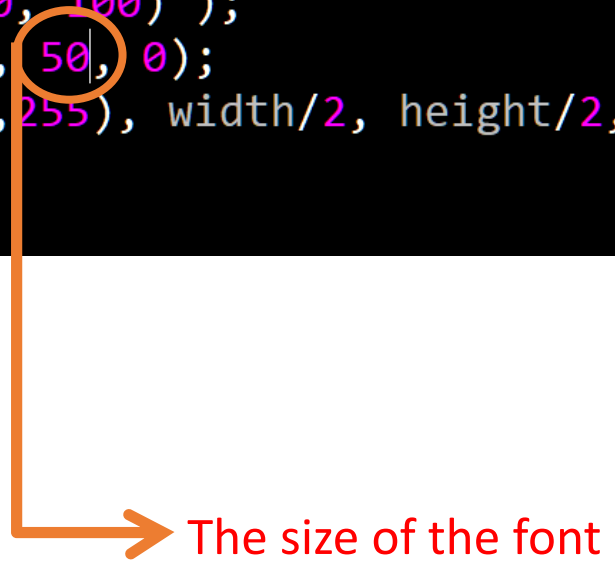
The path of the font file

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();
}
```



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

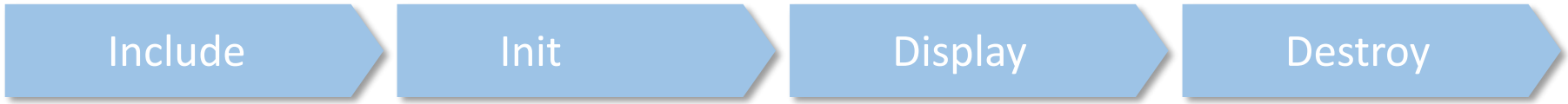
Include → Init → Display → Destroy

```
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

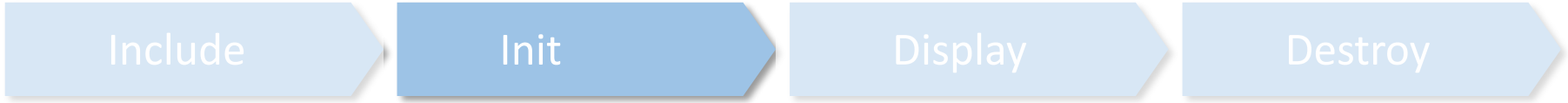
Include → Init → Display → Destroy

```
#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

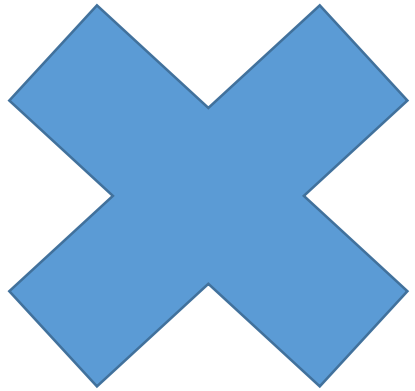
The width of edges of the rectangle is 2

Draw rectangle

- Draw rectangle on the window

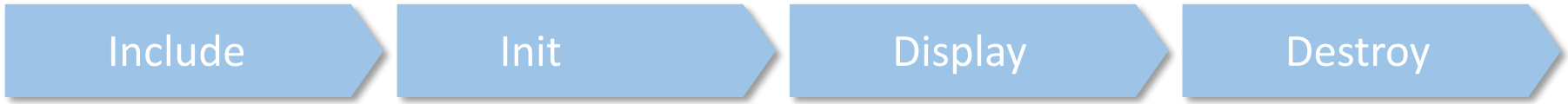
Include → Init → Display → Destroy

No need to destroy



Draw picture

- Draw picture on the window



Draw picture

- Draw picture on the window

Include → Init → Display → Destroy

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

Include the head file can draw picture on the window

Draw picture

- Draw picture on the window

Include → Init → Display → Destroy

```
al_init_image_addon();
```

Initialize the image function

Draw picture

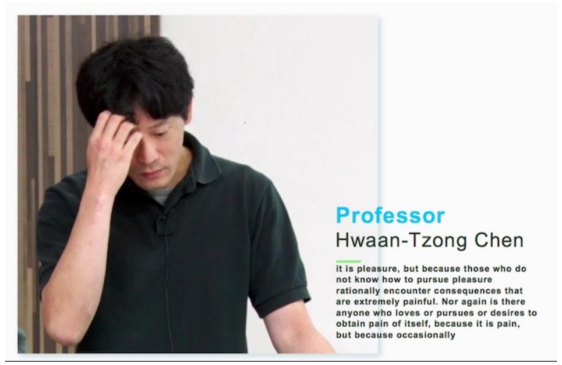
- Draw picture on the window

Include → Init → Display → Destroy

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

Store the image in to variable “img”

img:



Draw picture

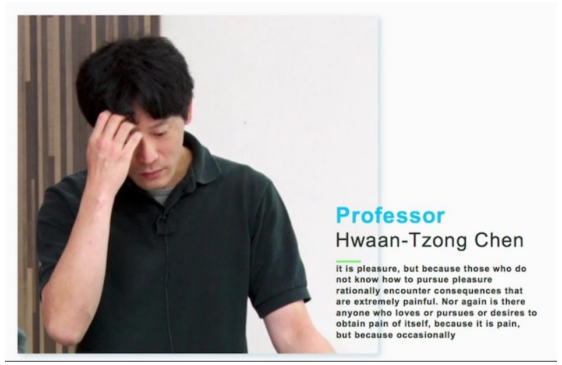
- Draw picture on the window

Include → Init → Display → Destroy

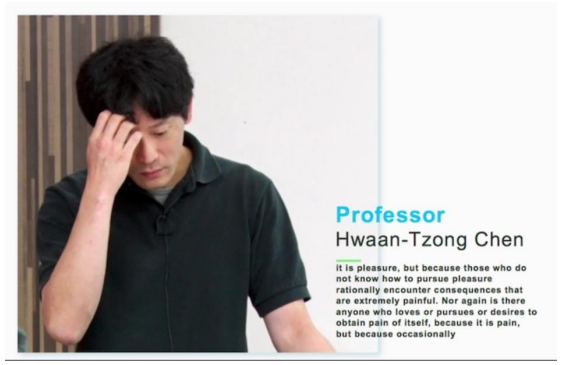
```
img = al_load_bitmap("htchen.jpg");
al_draw_bitmap(img, 0, 0, 0);
```

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

Include | Init | **Display** | Destroy

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

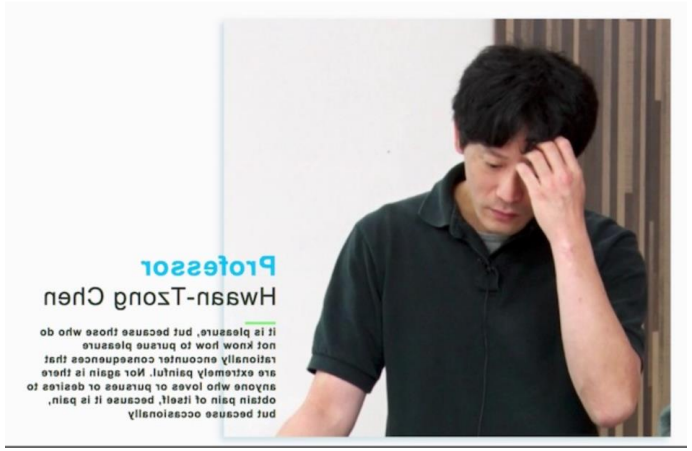
Usually 0, but you can put other two flags:
1. ALLEGRO_FLIP_HORIZONTAL: flip the image horizontally
2. ALLEGRO_FLIP_VERTICAL: flip the image vertically

Draw picture

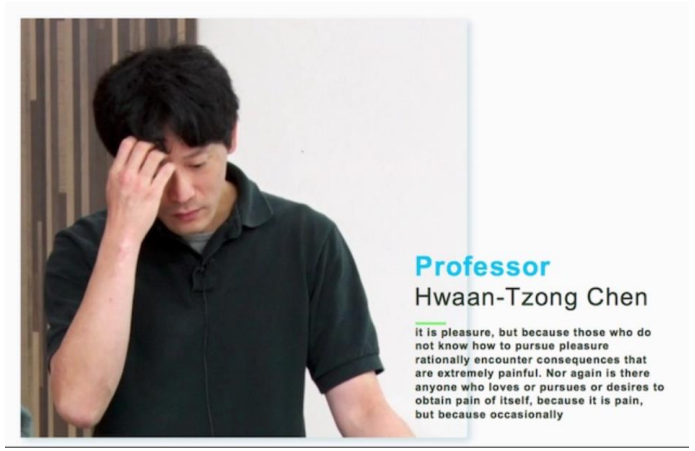
- Draw picture on the window

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

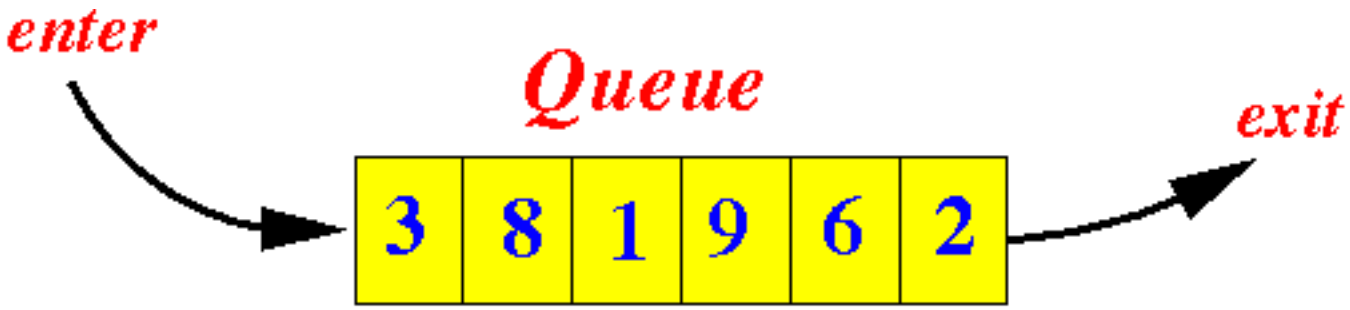
Practice

Finish task 2!!

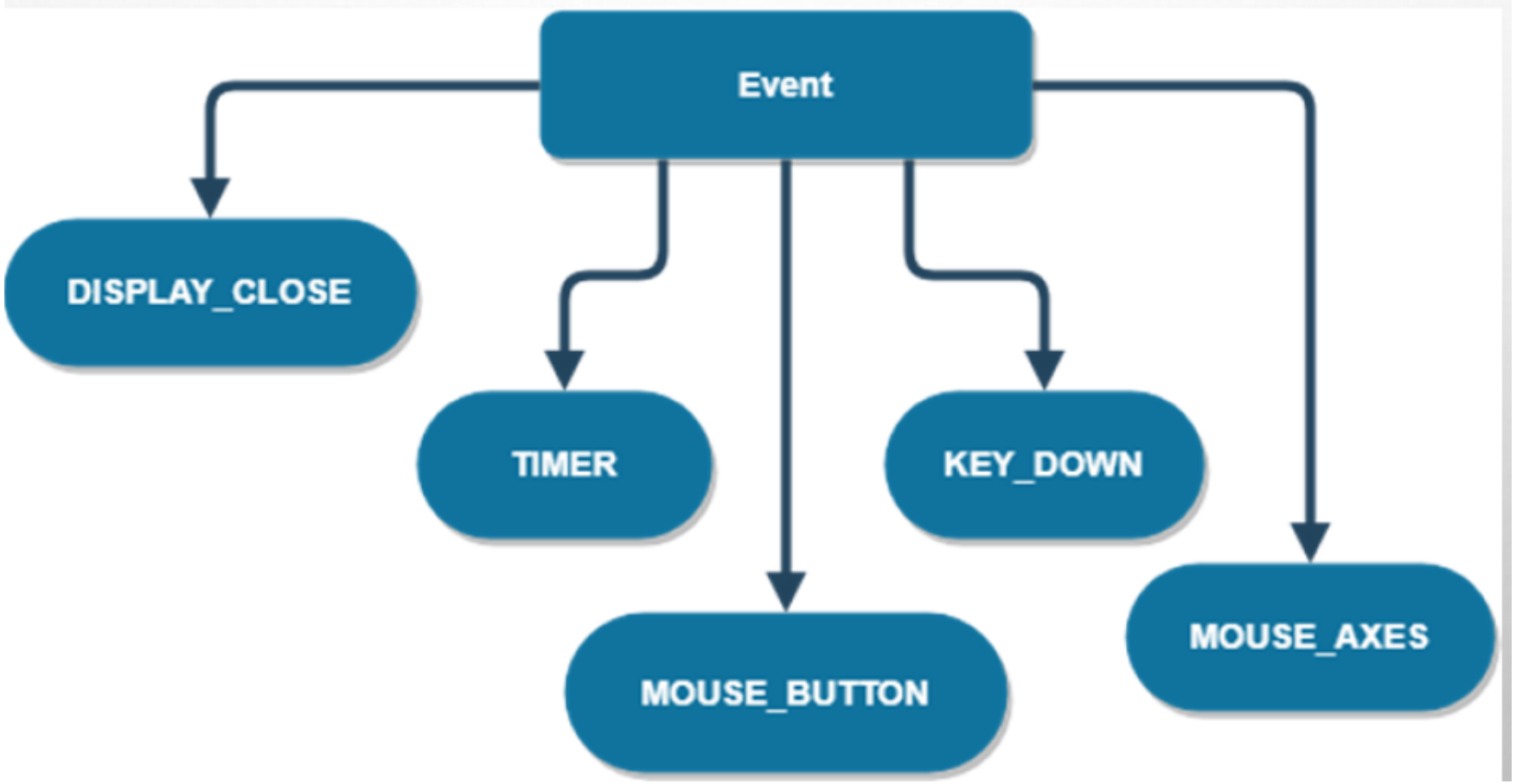
Outline

queue

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

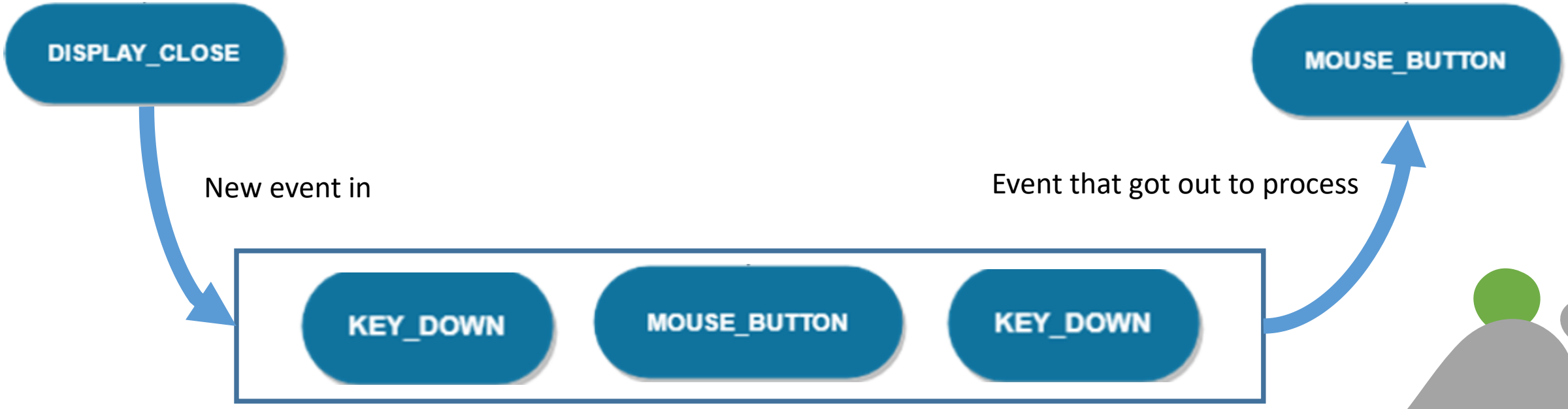


Type of event



Event queue

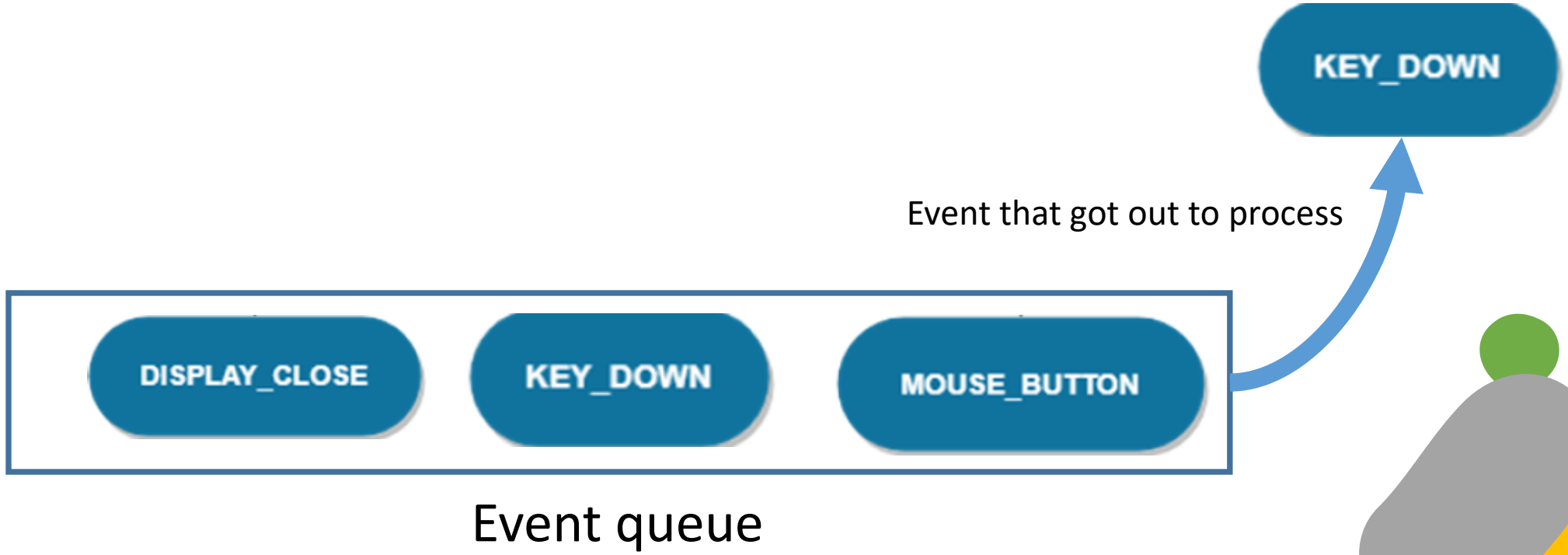
A queue that store event



Event queue

Event queue

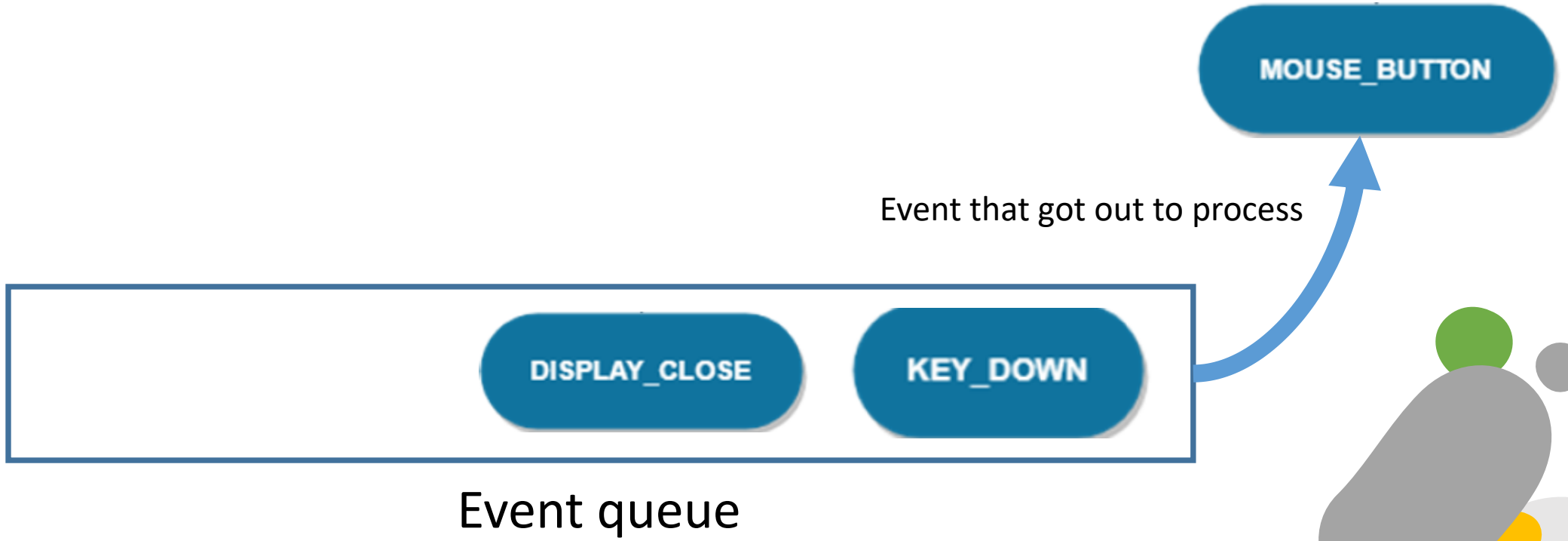
A queue that store event



Event queue

Event queue

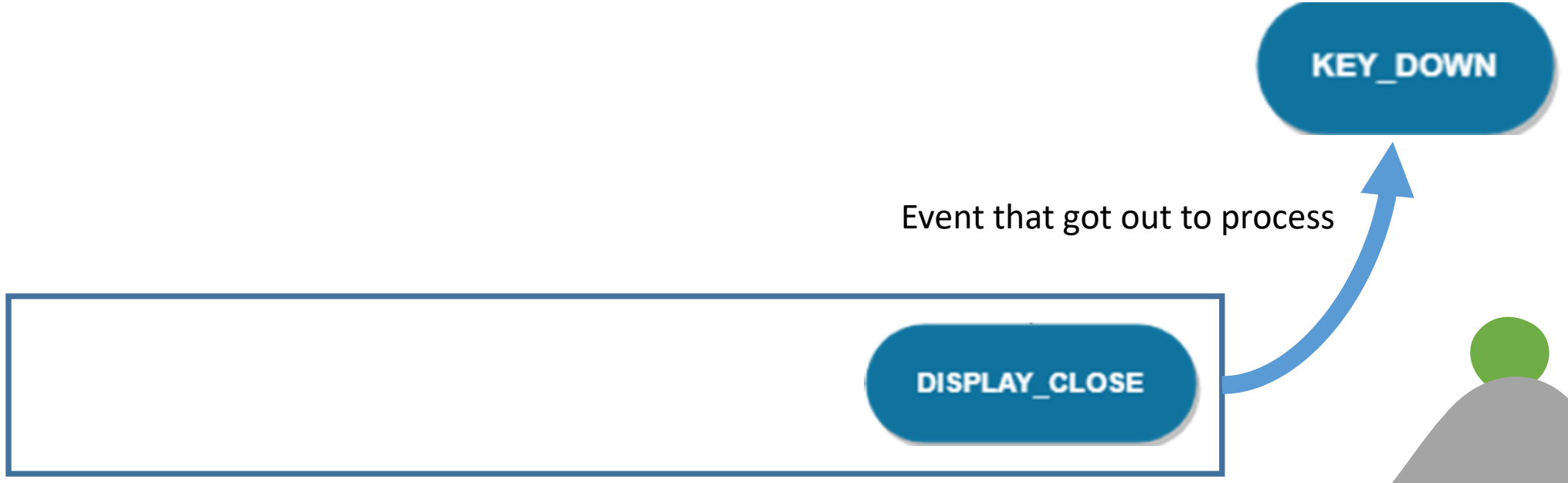
A queue that store event



Event queue

Event queue

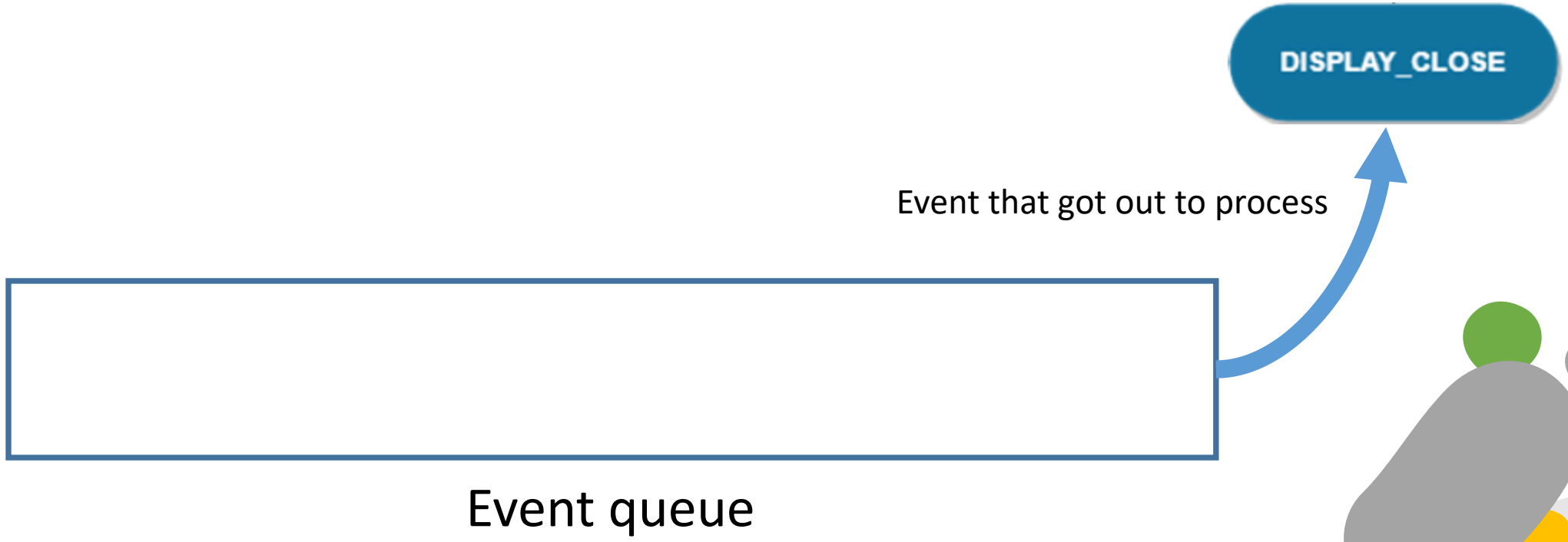
A queue that store event



Event queue

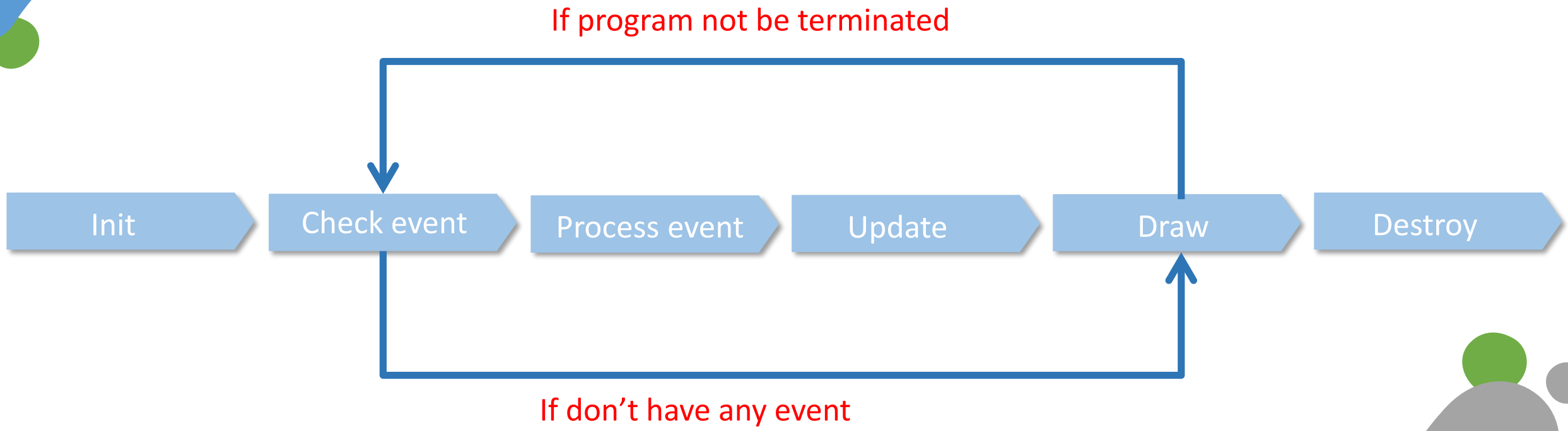
Event queue

A queue that store event

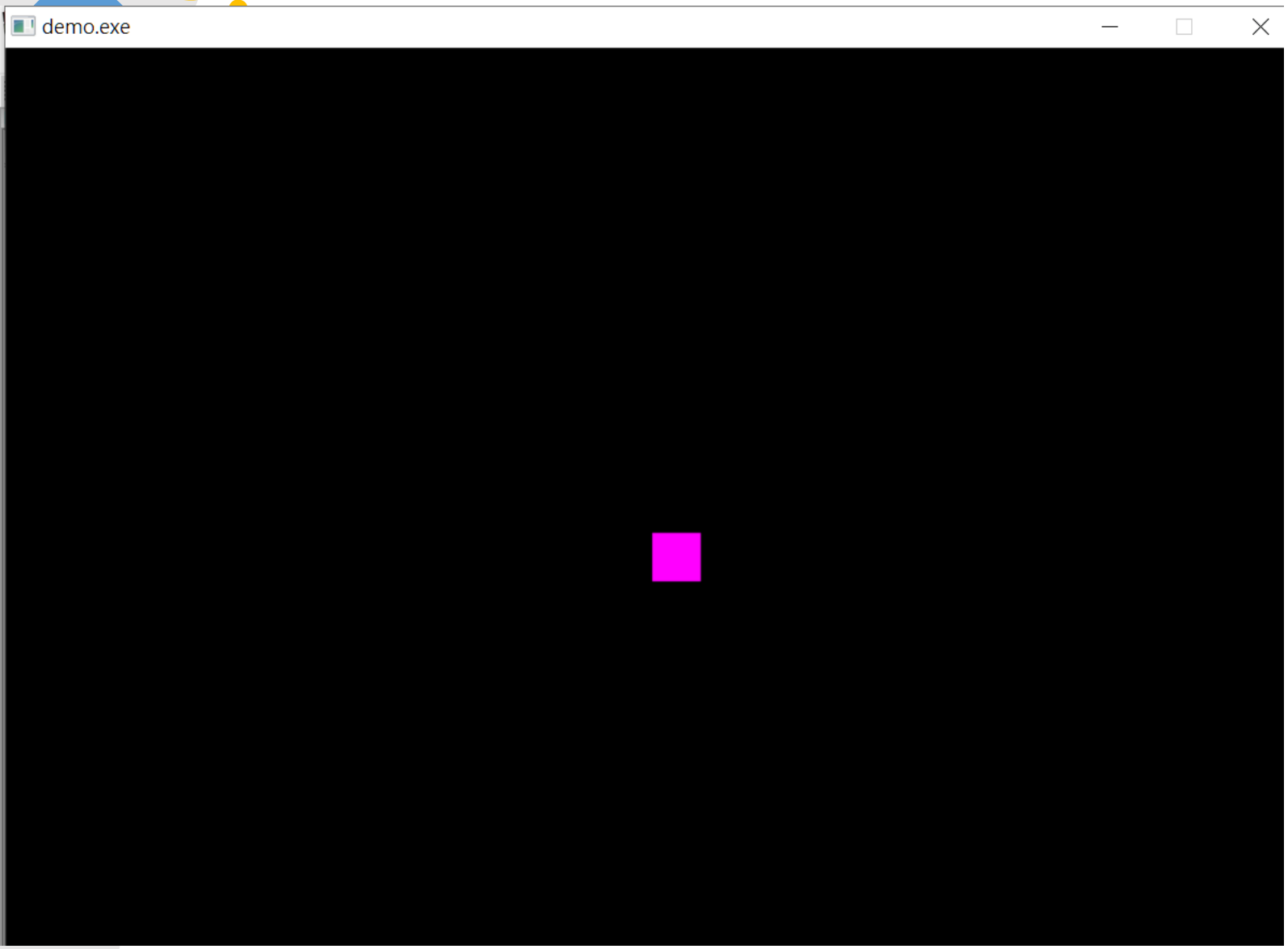


event

The process flow of event



event



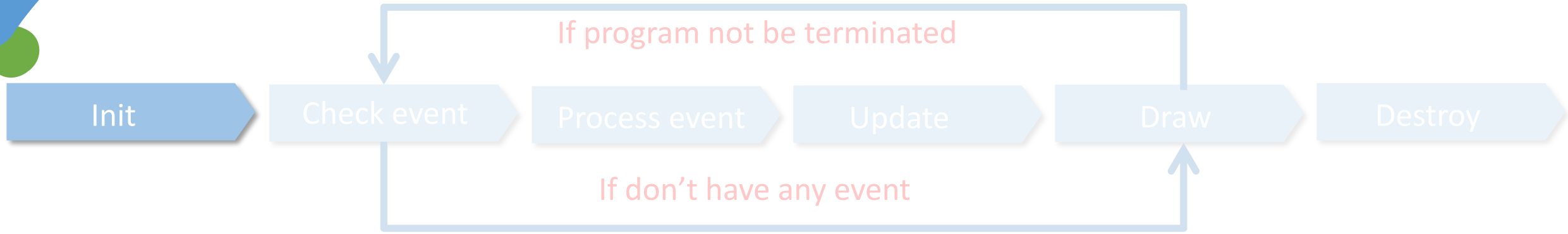
Take a program that you can move the rectangle around as example.

Use “WASD” to control the movement of rectangle.

Pressed “ESC” to terminate the program.

event

The process flow of event

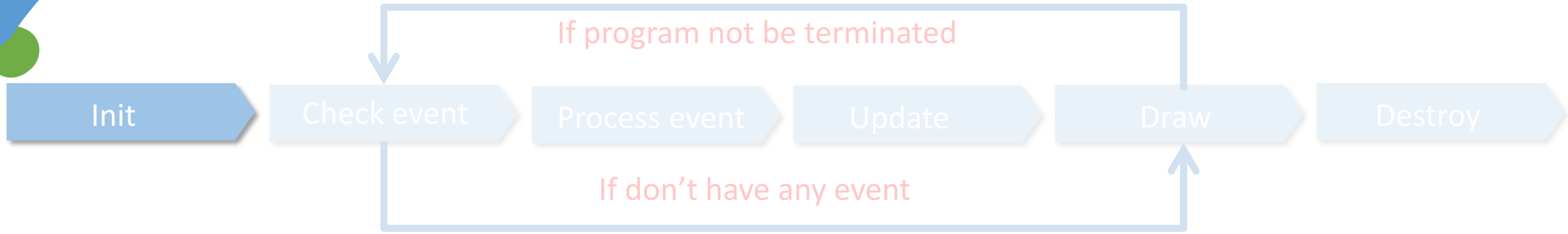



```c
int main(int argc, char *argv[]) {
    int msg = 0;
    game_init();
    while (msg != GAME_TERMINATE) {
        msg = game_run();
    }
    game_destroy();
    return 0;
}
```

```c
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



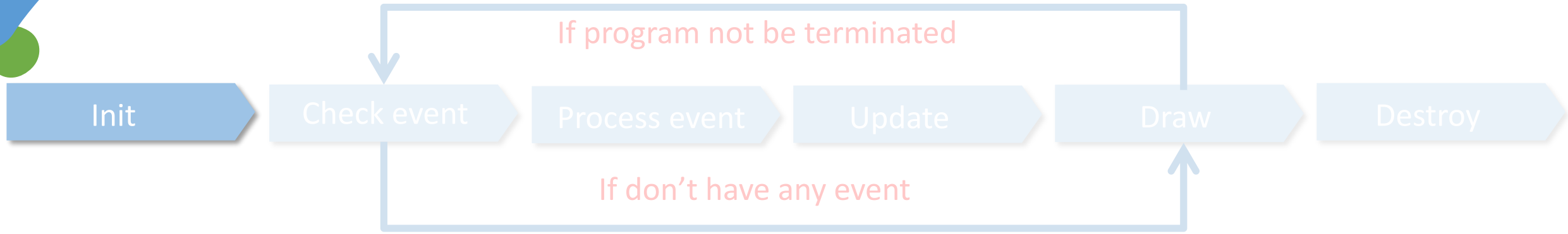

```c
int main(int argc, char *argv[]) {
    int msg = 0;
    game_init();
    while (msg != GAME_TERMINATE) {
        msg = game_run();
    }
    game_destroy();
    return 0;
}
```

```c
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



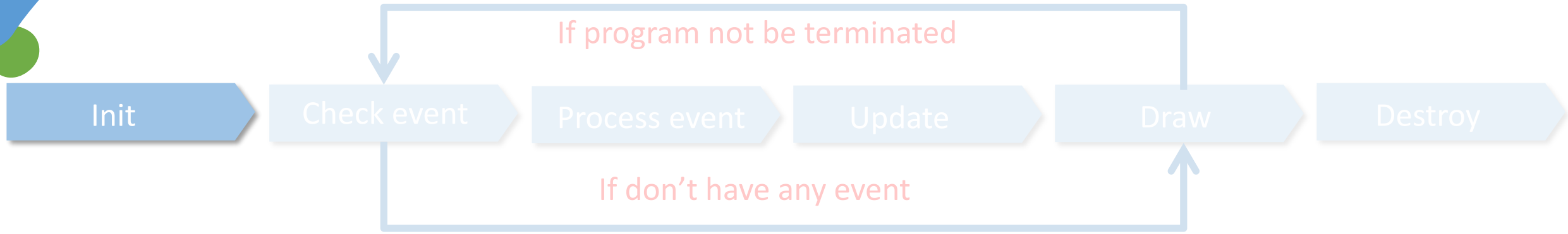

```c
int main(int argc, char *argv[]) {
    int msg = 0;
    game_init();
    while (msg != GAME_TERMINATE) {
        msg = game_run();
    }
    game_destroy();
    return 0;
}
```

```c
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



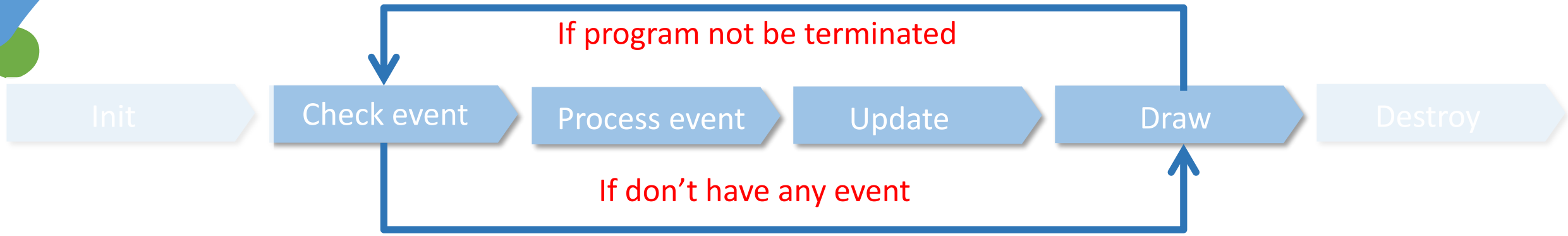

```c
int main(int argc, char *argv[]) {
    int msg = 0;
    game_init();
    while (msg != GAME_TERMINATE) {
        msg = game_run();
    }
    game_destroy();
    return 0;
}
```

```c
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

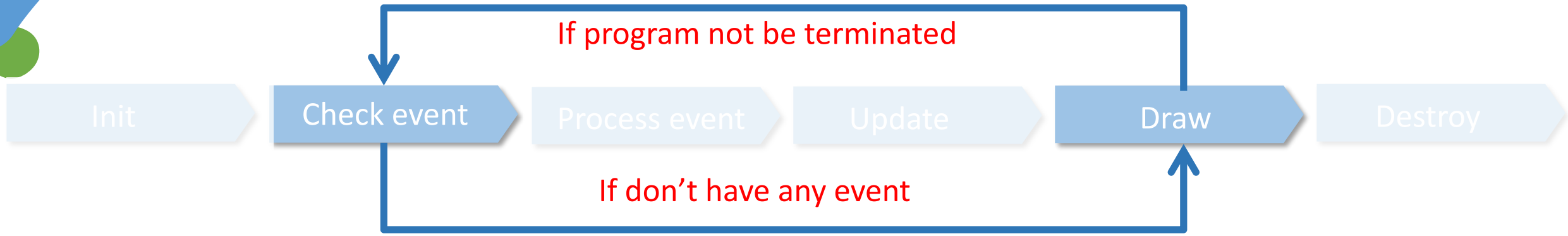



```
int main(int argc, char *argv[]) {
    int msg = 0;
    game_init();
    while (msg != GAME_TERMINATE) {
        msg = game_run();
    }
    game_destroy();
    return 0;
}
```

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

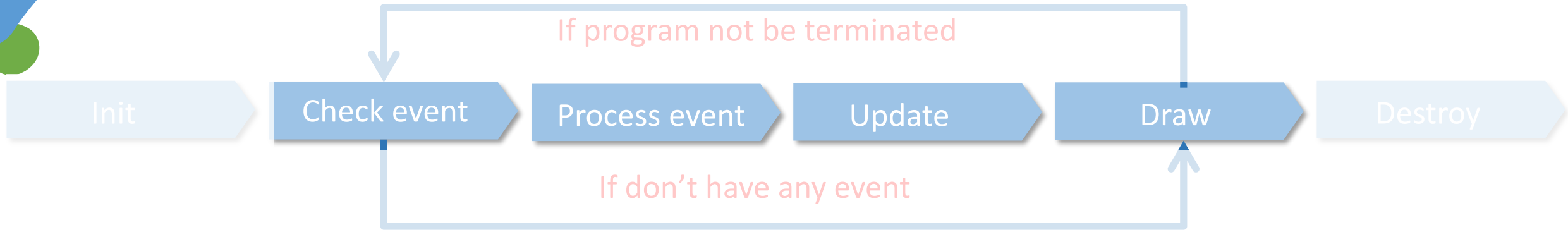
The process flow of event


```
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

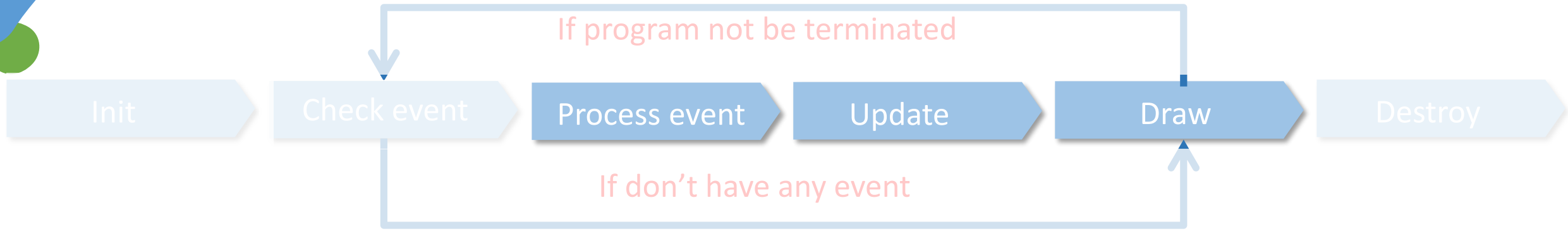



```
int game_run() {
    int error = 0;
    if (!al_is_event_queue_empty(event_queue)) {
        error = process_event();
    }
    game_draw();
    return error;
}
```

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

event

The process flow of event



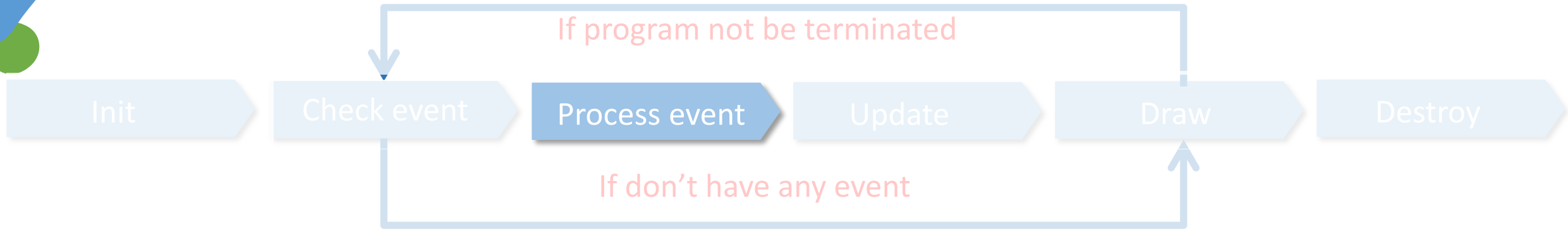

```
int process_event() {
    al_wait_for_event(event_queue, &event);
    keyboard_event();
    int error = game_update();
    game_draw();
    return error;
}
```

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

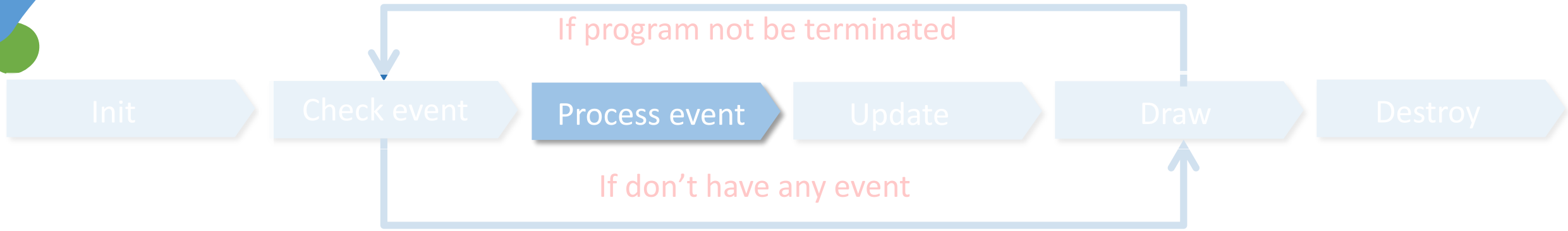



```
int process_event() {
    al_wait_for_event(event_queue, &event);
    keyboard_event();
    int error = game_update();
    game_draw();
    return error;
}
```

Process keyboard event

event

The process flow of event



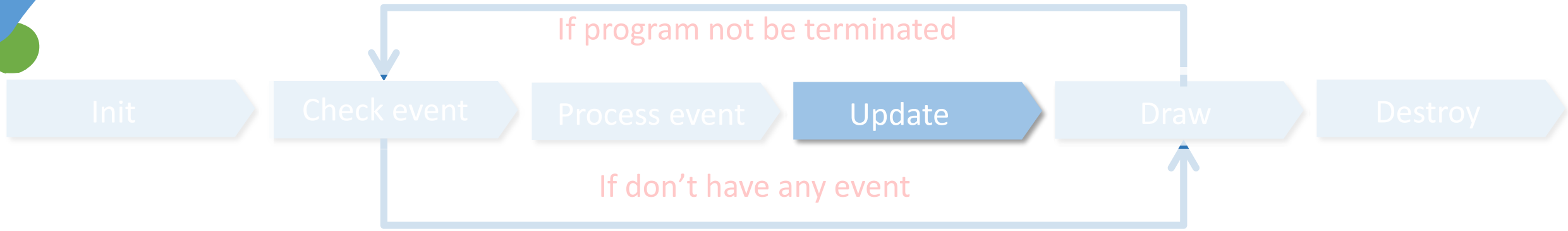

```
bool key_state[ALLEGRO_KEY_MAX];
int keyboard_event(){
    if( event.type == ALLEGRO_EVENT_KEY_DOWN ){
        key_state[event.keyboard.keycode] = true;

    }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. “even.keyboard.keycode” can get which key cause the event

event

The process flow of event

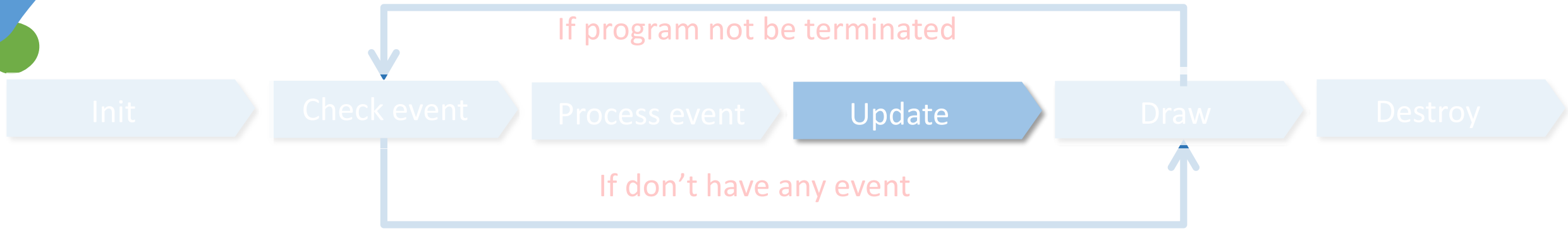



```
int process_event() {
    al_wait_for_event(event_queue, &event);
    keyboard_event();
    int error = game_update();
    game_draw();
    return error;
}
```

Update variables depend on the event

event

The process flow of event

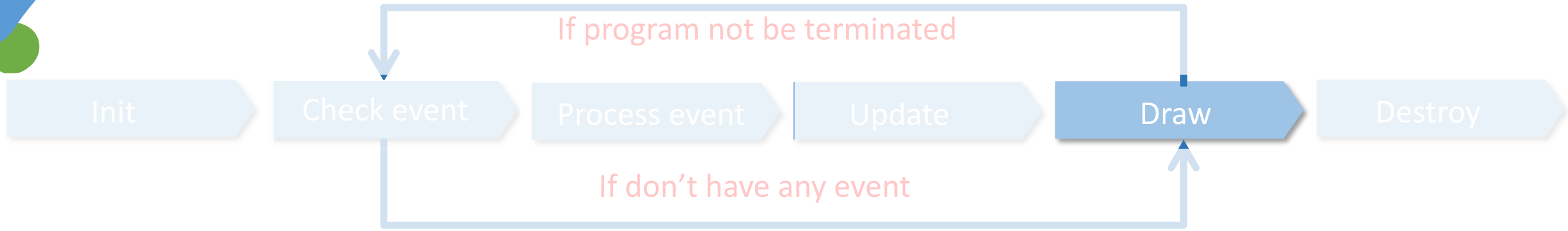



```
int game_update(){
    if( key_state[ALLEGRO_KEY_W] ){
        pos_y -= 10;
    }else if( key_state[ALLEGRO_KEY_A] ){
        pos_x -= 10;
    }else if( key_state[ALLEGRO_KEY_S] ){
        pos_y += 10;
    }else if( key_state[ALLEGRO_KEY_D] ){
        pos_x += 10;
    }else if( key_state[ALLEGRO_KEY_ESCAPE]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

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

event

The process flow of event

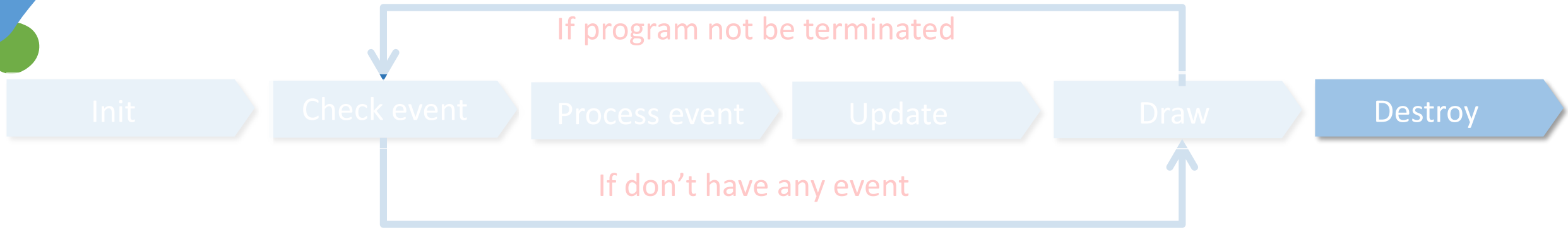



```
int process_event() {
    al_wait_for_event(event_queue, &event);
    keyboard_event();
    int error = game_update();
    game_draw();
    return error;
}
```

Draw what you want

event

The process flow of event

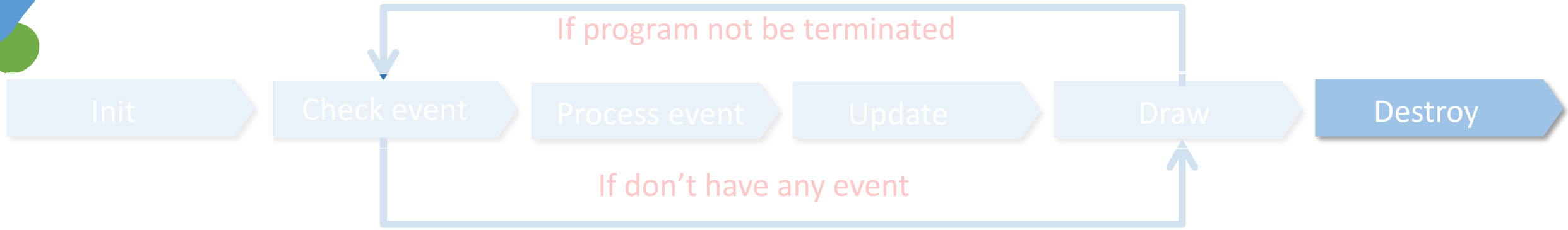



```
al_destroy_event_queue(event_queue);
```

→ Destroy event queue

event

The process flow of event

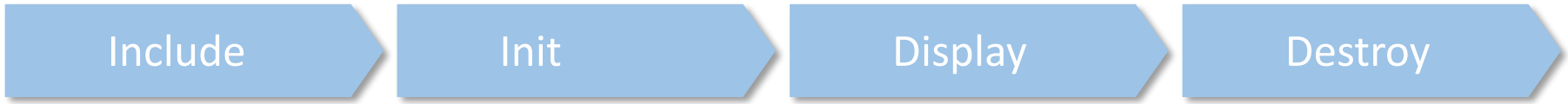



```
al_destroy_event_queue(event_queue);
```

→ Destroy event queue

Outline

Display sound



Display sound

Include → Init → Display → Destroy

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

Include the head file can display sound

Display sound

Include | Init | Display | Destroy

```
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

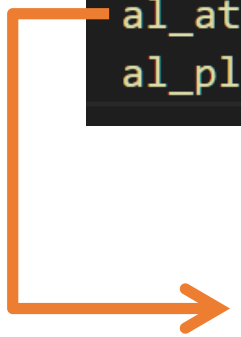
```
sample = al_load_sample("growl.wav");
startSound = al_create_sample_instance(sample);
al_set_sample_instance_playmode(startSound, ALLEGRO_PLAYMODE_ONCE);
al_attach_sample_instance_to_mixer(startSound, al_get_default_mixer());
al_play_sample_instance(startSound);
```

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

Include → Init → **Display** → Destroy

```
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

Include → Init → Display → Destroy

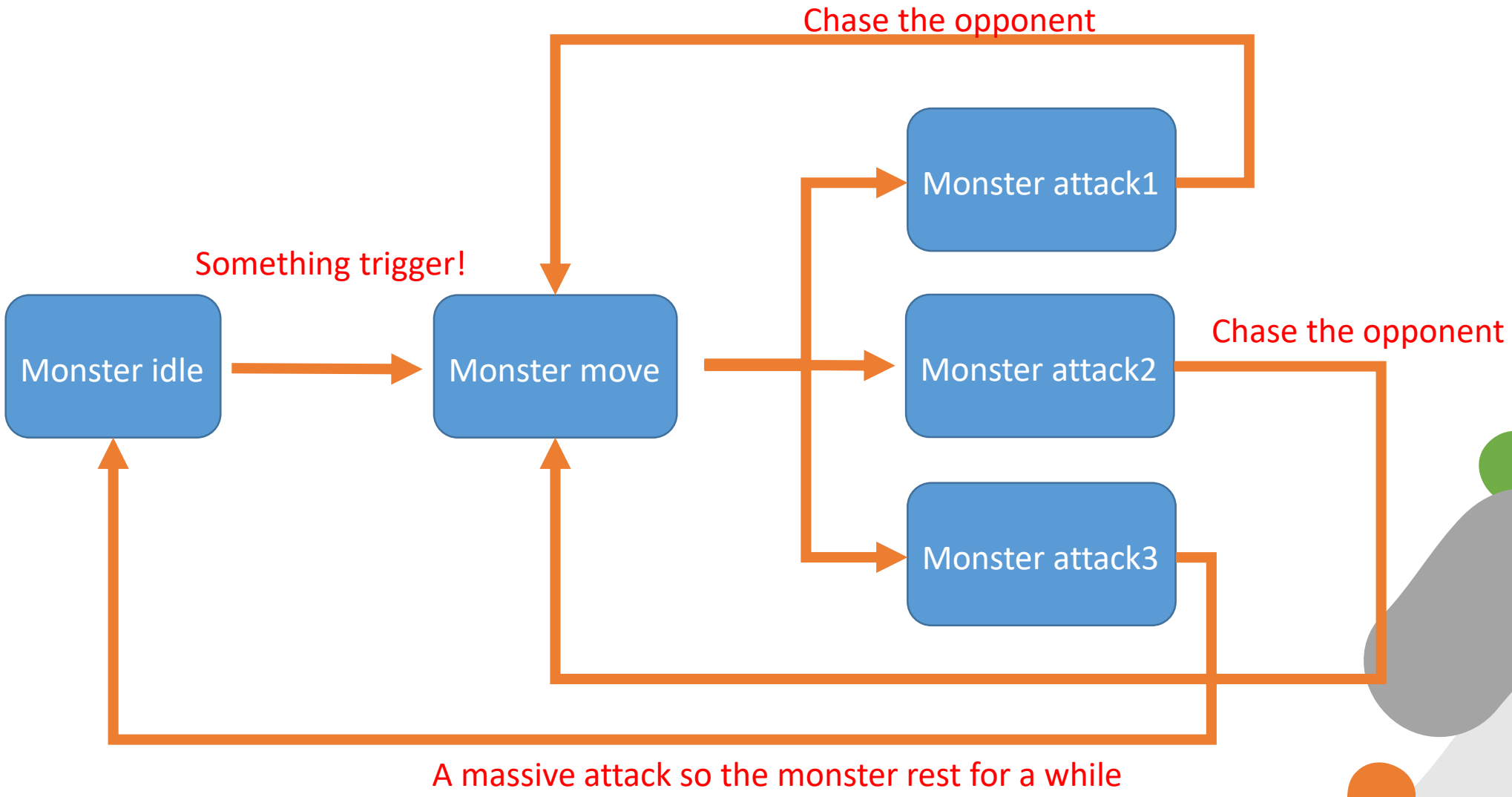
```
al_destroy_sample_instance(startSound);
```

Destroy the sample instance

Outline

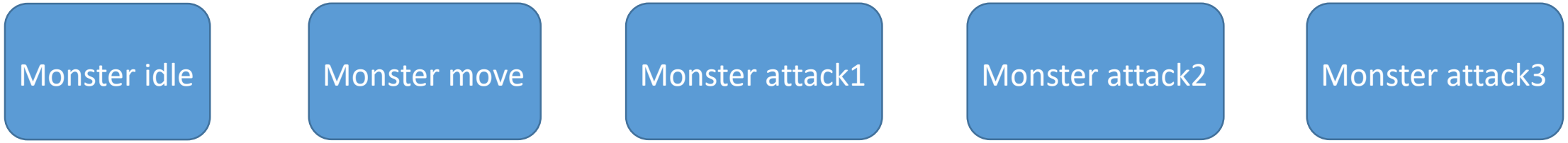
AI

~Use finite state machine!!!



AI

~Use finite state machine!!!



Draw the stop monster

Draw the moving animation

Draw the attack1 animation

Draw the attack2 animation

Draw the attack3 animation

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

Special effect sound

~Use finite state machine!!!

Monster idle	Monster move	Monster attack1	Monster attack2	Monster attack3
Display the sound of panting	Display the sound of moving	Display the sound of attack1	Display the sound of attack2	Display the sound of attack3

Just judge the state then use al_play_sample(*ALLEGRO_SAMPLE)

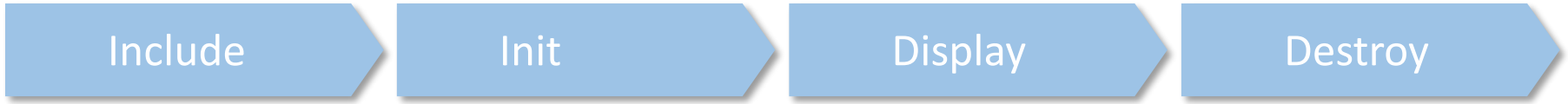
97

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 → Init → Display → Destroy

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

Display video

- Use allegro video addon!

Include | Init | Display | Destroy

```
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!

Include | Init | Display | Destroy

```
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!

Include → Init → Display → Destroy

```
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

Include | Init | Display | Destroy

```
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

Include | Init | Display | Destroy

```
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

Include | Init | Display | Destroy

```
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

Include | Init | Display | Destroy

```
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

Include | Init | Display | Destroy

```
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

Include | Init | Display | Destroy

```
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

Include | Init | Display | Destroy

```
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

Include | Init | Display | Destroy

```
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

Include → Init → **Display** → Destroy

```
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

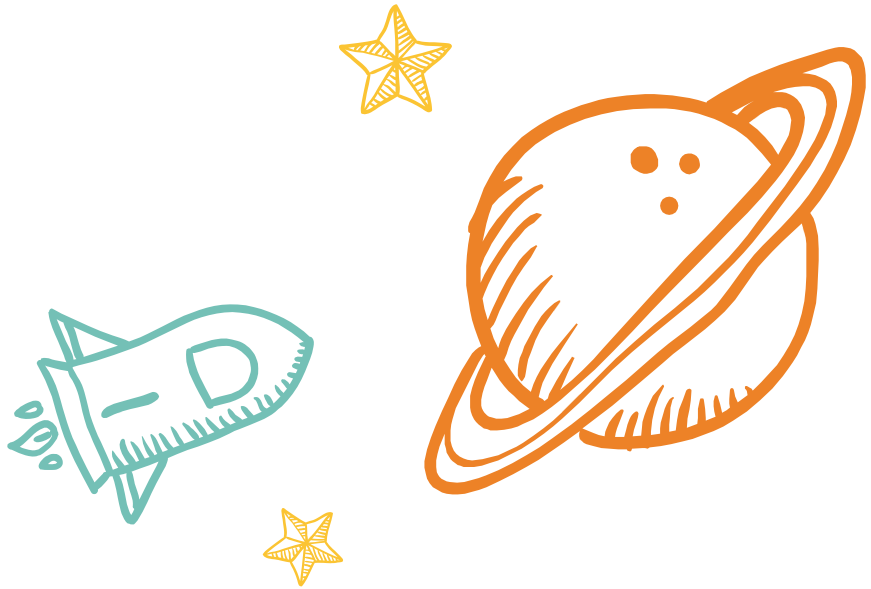
```
al_draw_scaled_bitmap(frame,
                      0, 0,
                      al_get_bitmap_width(frame),
                      al_get_bitmap_height(frame),
                      0, 0,
                      al_get_display_width(screen),
                      al_get_display_height(screen), 0);
```


```
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);
```

Display video

Include → Init → Display → Destroy

- Close the video will automatically destroy the video.



The End~