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You can also read this information on my GitHub [wiki-pages](#). Maybe it w

Link: <https://github.com/VBrazhnik/FdF/wiki> 494 ([https://github.com/VBrazhnik/FdF/wiki](#))

[How to handle mouse buttons and](#)

On macOS, if you want to handle mouse buttons and key presses and close function instead of the other hook functions:

```
int mlx_hook(void *win_ptr, int x_event, int x_mas
```

[To handle a key press](#)

At the place of `int x_event` parametr use 2 .

At the place of `int (*funct)()` parameter you use the following functio

```
Data Definitions for libX11 547
int key_press(https://refspecs.linuxfoundation.org/bscomspec/\_1.3.0/gLSB/gdeffs.html) refspecs.linuxfoundation.org
```

[To handle a key release](#)

At the place of `int x_event` parametr use 3 .

At the place of `Bresenham's line algorithm` you use the following functio

```
(https://en.wikipedia.org/wiki/Bresenham%27s_line_algorithm)
int key_release(int keycode, void *param)
```

Rotation matrix - Wikipedia 295

[To handle a mouse button press](#)

At the place of `int x_event` parametr use 4 .

Xiaolin Wu's line algorithm - Wikipedia 255

At the place of `int x_event` parametr use 5 .

At the place of `int x_event` parametr use 6 .

int mouse_press(https://en.wikipedia.org/wiki/Mouse_input) method *param

Компьютерная графика 231

[To handle a mouse button release](#)

At the place of `int x_event` parametr use 7 .

Isometric 2:1 Projections: Isometric Infographic Vectors - Vectips 189

At the place of `int x_event` parametr use 8 .

At the place of `int x_event` parametr use 9 .

infographic-vectors/ / vectips.com

int mouse_release(<https://www.kirupa.com/developer/actionscript/isometric-matrix-vector-tutorial>) int x, void *param

(<https://www.kirupa.com/developer/actionscript/isometric-matrix-vector-tutorial>)

[To handle a mouse movement](#)

How do I calculate color gradients? - Graphic Design Stack Exchange 139

At the place of `int x_event` parametr use 10 .

At the place of `int x_event` parametr use 11 .

graphicdesign.stackexchange.com

int mouse_move(<http://www.scratchapixel.com/lessons/mathematics-physics-tutorial/how-does-matrix-work-part-1>) scratchapixel.com

[To handle an expose event](#)

At the place of `int x_event` parametr use 12 .

```
# MiniLibX [2] (/Tags/716/Topics)
# News (/Tags/844/Topics)
# Norminette [22] (/Tags/15/Topics)
#
Partnerships [1] (/Tags/487/Topics)
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# Avaj-Launcher (/Tags/598/Topics)
# Big Web Project (/Tags/95/Topics)
# Blackhole - [1] (/Tags/692/Topics)
# Peer Help (/Tags/321/Topics)
```

At the place of `int (*funct)()` parameter you use the following function:

```
int expose(FdFTags *fdftags, Graphics *tags)
```

To handle a red button (X button) press

At the place of `int x_event` parameter use 17 .

At the place of `int (*funct)()` parameter you use the following function:

```
int close(void *param)
```

Complete `int close(void *param)` function:

```
int close(void *param)
{
    (void)param;
    exit(0);
}
```

Tip:

`x_mask` is ignored on macOS. But if you want that your FdF will have cc

Key codes**Mouse button codes**

- Left button — 1
- Right button — 2
- Third (Middle) button — 3
- Scroll Up — 4
- Scroll Down — 5
- Scroll Left — 6
- Scroll Right — 7

Masks

You can find values of `x_mask` here [544](https://refspecs.linuxfoundation.org) (<https://refspecs.linuxfoundation.org>)

Tip:

`x_mask` for `int close(void *param)` is `(1L << 17)` .

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- # BSQ 25 (/Tags/131/Topics)
- # Camagru (/Tags/431/Topics)
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- # C Exam ★
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Created by vbrazhni (<https://profile.intra.42.fr/users/vbrazhni>) **2018-08-23 12:29** – 1.7K word
Posted in cursus 42 — Written in English



Altruist vbrazhni

(<https://profile.intra.42.fr/users/vbrazhni>)



How to draw a line?

To draw a line you can use Bresenham's line algorithm [281](#) (https://en.wikipedia.org/wiki/Bresenham%27s_line_algorithm) or Xiaolin Wu's line algorithm [236](#) (https://en.wikipedia.org/wiki/Xiaolin_Wu%27s_line_algorithm) solution which will produce more beautiful result).



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How to create linear gradient?

Here we will consider how to find the color between any two color points!

First of all we need to find current point position between two points with known percentages.

The following function will help you find this value:

```
double percent(int start, int end, int current)
{
    double placement;
    double distance;

    placement = current - start;
    distance = end - start;
    return ((distance == 0) ? 1.0 : (placement / distance));
}
```

You can calculate this value depending on which delta value is bigger. Delta values.

Part of code:

```
// ...
    double percentage;

    if (delta.x > delta.y)
        percentage = percent(start.x, end.x, current);
    else
        percentage = percent(start.y, end.y, current);
// ...
```

Then for creating each light (Red, Green, Blue) we need to get light from start and end and then calculate new color by union red, green and blue light.

Part of code:

```
# Drivers And          (/Tags/562/Topics)★
  Interrupts
# Dr Quine           (/Tags/552/Topics)
# DSLR               (/Tags/710/Topics)
# Durex              (/Tags/620/Topics)
# EvalExpr 7         (/Tags/130/Topics)
# Exam00 8           (/Tags/315/Topics)
# Exam01 6           (/Tags/316/Topics)
# Exam02 6           (/Tags/317/Topics)
# Exam Final 12      (/Tags/318/Topics)
# Expert System 2     (/Tags/68/Topics)★
# Famine             (/Tags/590/Topics)
# FdF 12             (/Tags/26/Topics)
# Filesystem          (/Tags/563/Topics)
# Filler 2            (/Tags/108/Topics)
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# Final Internship 6  (/Tags/147/Topics)★
# First Internship 8  (/Tags/525/Topics)★
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# Fract'ol 8          (/Tags/33/Topics)
# Framework 0          (/Tags/96/Topics)★
# Framework 1          (/Tags/97/Topics)
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# Friends With Benefits 1  (/Tags/540/Topics)★
# Ft_ality             (/Tags/518/Topics)
# Ft_db                (/Tags/603/Topics)
# Ft_debut 2           (/Tags/679/Topics)
# Ft_hangouts          (/Tags/320/Topics)
# Ft_linear_regression (/Tags/325/Topics)★
# Ft_linux              (/Tags/548/Topics)
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# Ft_nmap              (/Tags/480/Topics)
# Ft_p 1                (/Tags/53/Topics)
# Ft_ping              (/Tags/433/Topics)
# Ft_prinff 15          (/Tags/28/Topics)
# Ft_script             (/Tags/52/Topics)
# Ft_select 3           (/Tags/48/Topics)
# Ft_sh2                (/Tags/44/Topics)
# Ft_sh3                (/Tags/49/Topics)
# Ft_sommelier 2        (/Tags/757/Topics)★
# Ft_ssl_des 2           (/Tags/649/Topics)
# Ft_ssl_md5 2           (/Tags/650/Topics)
# Ft_ssl_rsa             (/Tags/648/Topics)
# Ft_traceroute          (/Tags/435/Topics)
```

```
// ...
int red;
int green;
int blue;

// Get percentage

red = get_light((start.color >> 16) & 0xFF, (e
green = get_light((start.color >> 8) & 0xFF, (b
blue = get_light(start.color & 0xFF, end.color
return ((red << 16) | (green << 8) | blue);
```

```
int get_light(int start, int end, double percentag
{
    return ((int)((1 - percentage) * start + perce
}
```

Complete code:

```
int get_light(int start, int end, double percentag
{
    return ((int)((1 - percentage) * start + perce
}

int get_color(t_point current, t_point start, t_po
{
    int      red;
    int      green;
    int      blue;
    double   percentage;

    if (current.color == end.color)
        return (current.color);
    if (delta.x > delta.y)
        percentage = percent(start.x, end.x, curre
    else
        percentage = percent(start.y, end.y, curre
    red = get_light((start.color >> 16) & 0xFF, (e
    green = get_light((start.color >> 8) & 0xFF, (b
    blue = get_light(start.color & 0xFF, end.color
    return ((red << 16) | (green << 8) | blue);
```

Basic information was found here 126 (<https://graphicdesign.stackexchange.com/questions/126/how-to-set-a-transparent-color-in-mlx-image>)

Color for pixel

Everything is easy if you decided to use the following function:

```
int mlx_pixel_put(void *mlx_ptr, void *win_ptr, in
```

In this case, the order of lights is standard:

O R G B

8 bits8 bits8 bits8 bits

As you can see that the first byte is filled with zeros. It means that the alpha

You can find this information in `mlx_pixel_put` man file.

Also, this information is actual for color parameter in the function which disp

```
int mlx_string_put(void *mlx_ptr, void *win_ptr, i
```

But if you decided to use an image, you will face with more complicated us

You will work with the following three functions:

```
void *mlx_new_image(void *mlx_ptr, int width, int
```

```
# Ft_turing (/Tags/486/Topics)
# Ft_vox (/Tags/646/Topics)
# Ft_zenko (/Tags/644/Topics)
# GBmu (/Tags/541/Topics)
# Genesis B (/Tags/873/Topics)
#
Get_Next_Line [12] (/Tags/18/Topics)
# Gomoku (/Tags/70/Topics)
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# H2S Mentorship (/Tags/734/Topics)
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# H2S Project Authorship - T1 (/Tags/723/Topics)
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# Hackathon Born2Hack (/Tags/780/Topics)
# HackerRank University (/Tags/724/Topics)
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#
Harassment_policy [2] (/Tags/632/Tc)
# Hercules (/Tags/592/Topics)
# HumanGL (/Tags/429/Topics)
# Hypertube [1] (/Tags/482/Topics)
# Init [5] (/Tags/545/Topics)
# In The Shadows (/Tags/536/Topics)
# IRC [1] (/Tags/109/Topics)
# Jour 01 (/Tags/113/Topics)
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# Jour 03 [1] (/Tags/114/Topics)
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# Jour 06 [3] (/Tags/117/Topics)
# Jour 07 [1] (/Tags/118/Topics)
# Jour 08 [3] (/Tags/119/Topics)
# Jour 09 [2] (/Tags/124/Topics)
# Jour 10 [2] (/Tags/120/Topics)
# Jour 11 (/Tags/121/Topics)
# Jour 12 [1] (/Tags/122/Topics)
# Jour 13 [2] (/Tags/123/Topics)
# KFS-1 (/Tags/565/Topics)
# KFS-2 (/Tags/582/Topics)
```

```
char *mlx_get_data_addr(void *img_ptr, int *bits_p
```

```
int mlx_put_image_to_window(void *mlx_ptr, void *
```

And the most interesting is the second function with such parameters as `bits_per_pixel`

What is bits per pixel or bit-depth value?

The number of bits used to define a pixel's color shade is as 24-bit color. Some new color display systems offer a `alpha channel`, is used for control and special effects info

For macOS value of `bits_per_pixel` is constant. You can find the follo

```
#define UNIQ_BPP 4
```

```
// assume here 32bpp little endian
```

```
char *mlx_get_data_addr(mlx_img_list_t *img_ptr, int *endian)
{
    *bits_per_pixel = UNIQ_BPP * 8;
    *size_line = img_ptr->width * UNIQ_BPP;
    // ...
}
```

If you decided to support only macOS, you don't need to worry about the bytes (32 bits).

`endian` is the most important parameter that we have to consider.

For macOS its value is `0`, which means `little endian`.

Information about `endian` value you can also find in source files of minilib

```
/*
** endian : 0 = sever X is little endian, 1 = big
** endian : useless on macos, client and graphical */

```

```
// assume here 32bpp little endian
```

```
char *mlx_get_data_addr(mlx_img_list_t *img_ptr, int *endian)
{
    // ...
    *endian = 0; // little endian for now on mac-i
    // ...
}
```

Big-endian and little-endian are the formats of ordering bytes.

Big-endian is the format that we used to know as **normal**.

Little-endian order is **reversed**.

For color these two formats look like:

Byte number 0 1 2 3

Big endian 0 RGB
Little endian BG R0

So in the case of little-endian format, you have to use reversed order of col

```
# KFS-3      (/Tags/585/Topics)
# KFS-4      (/Tags/591/Topics)
# KFS-5      (/Tags/597/Topics)
# KFS-6      (/Tags/601/Topics)
# KFS-7      (/Tags/602/Topics)
# KFS-8      (/Tags/610/Topics)
# KFS-9      (/Tags/611/Topics)
# KFS-X [1]  (/Tags/612/Topics)
# KIFT [2]   (/Tags/622/Topics)
# KrpSim    (/Tags/425/Topics)
# Lem_in [3]  (/Tags/137/Topics)
# Lem-Ipc   (/Tags/106/Topics)
# Libft [31]  (/Tags/6/Topics)
# LibftASM   (/Tags/46/Topics)
# LinkedIn   (/Tags/832/Topics)
# Little-Penguin-1 (/Tags/550/Topics)
# Malloc [1]  (/Tags/50/Topics)
# Matcha [6]  (/Tags/481/Topics)
# Match-N-Match [6]  (/Tags/129/Topics)
# Matrice    (/Tags/615/Topics)
# Matt Daemon (/Tags/553/Topics)
# Minishell [3]  (/Tags/29/Topics)
# Mod1       (/Tags/45/Topics)
# Multilayer Perceptron (/Tags/755/Topics)
# Music Room (/Tags/571/Topics)
# Netflix Hackathon (/Tags/733/Topics)
# Nibbler    (/Tags/65/Topics)
# Nm-Otool [1]  (/Tags/51/Topics)
# NP1 [1]    (/Tags/758/Topics)
# N-Puzzle   (/Tags/67/Topics)
# Open Project I (/Tags/57/Topics)
# Open Project II (/Tags/501/Topics)
# Override   (/Tags/616/Topics)
# Particle System (/Tags/537/Topics)
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# Piscine Reloaded [3]  (/Tags/580/Topics)
```

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21 ↓ 1
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```
// ...
int i;

i = (x * fdf->bits_per_pixel / 8) + (y * fdf->
fdf->data_addr[i] = color; // B - Blue
fdf->data_addr[++i] = color >> 8; // G - Green
fdf->data_addr[++i] = color >> 16; // R - Red
fdf->data_addr[++i] = 0; // Alpha channel
// ...
```

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How to rotate figure in 3D?

If you want to rotate a vector you should construct what is known as a rotation matrix (https://en.wikipedia.org/wiki/Rotation_matrix).

X-Axis Rotation

$$R_x(\theta) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos(\theta) & -\sin(\theta) \\ 0 & \sin(\theta) & \cos(\theta) \end{bmatrix}$$

After the transformations, we will get the formulas:

$$\begin{aligned} x' &= x; \\ y' &= y * \cos(\theta) + z * \sin(\theta); \\ z' &= -y * \sin(\theta) + z * \cos(\theta); \end{aligned}$$

Y-Axis Rotation

$$R_y(\theta) = \begin{bmatrix} \cos(\theta) & 0 & \sin(\theta) \\ 0 & 1 & 0 \\ -\sin(\theta) & 0 & \cos(\theta) \end{bmatrix}$$

After the transformations, we will get the formulas:

$$\begin{aligned} x' &= x * \cos(\theta) + z * \sin(\theta); \\ y' &= y; \\ z' &= -x * \sin(\theta) + z * \cos(\theta); \end{aligned}$$

Z-Axis Rotation

$$R_z(\theta) = \begin{bmatrix} \cos(\theta) & -\sin(\theta) & 0 \\ \sin(\theta) & \cos(\theta) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

After the transformations, we will get the formulas:

$$\begin{aligned} x' &= x * \cos(\theta) - y * \sin(\theta); \\ y' &= x * \sin(\theta) + y * \cos(\theta); \\ z' &= z; \end{aligned}$$

Source of information 227 (<http://grafika.me/node/82>) (Russian)

Piscine ★
 Ruby On [1] (/Tags/589/Topics)
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Roger-Skyline-2 ★ (/Tags/544/Topics)
Root-Me | Cracking ★ (/Tags/323/Topics)
RT [12] (/Tags/41/Topics)
RTv1 [6] (/Tags/40/Topics)
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UNIT Factory ★
 Harassment & Tolerance Policy (/Tags/688/Topics)



Altruist vbrazhni

(<https://profile.intra.42.fr/users/vbrazhni>)



How to perform isometric transform

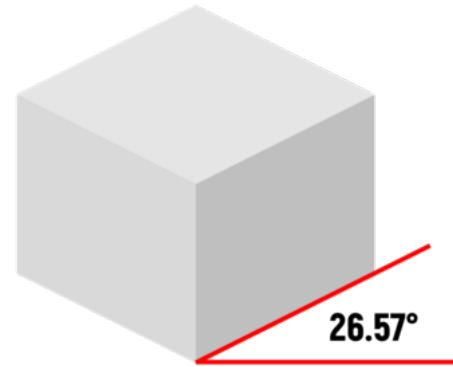
There are “true” isometric projection and **2:1** isometric projection.

True isometric projection uses a 30° angle (0.523599 rad).

2:1 isometric projection uses a 26.57° angle (0.46373398 rad).

2:1 ISOMETRIC PROJECTION

TRI



Source of information 179 (<http://vectips.com/tutorials/isometric-infographic>)

Code for transforming:

```
static void iso(int *x, int *y, int z)
{
    int previous_x;
    int previous_y;

    previous_x = *x;
    previous_y = *y;
    *x = (previous_x - previous_y) * cos(0.523599);
    *y = -z + (previous_x + previous_y) * sin(0.523599);
}

t_point project(t_point p, t_fdf *fdf)
{
// ...
    if (fdf->camera->projection == ISO)
        iso(&p.x, &p.y, p.z);
// ...
}
```

Source of information 167 (https://www.kirupa.com/developer/actions/transforming_3d_isometric_coordinates.htm)

Userspace_digressions (/Tags/753/Topics)

Walking Marvin [1] (/Tags/647/Topics)

War [2] (/Tags/618/Topics)

Web Initiation (/Tags/524/Topics)

Wildcard (/Tags/827/Topics)

Wolf3d [4] (/Tags/30/Topics)

Woody Woodpacker (/Tags/549/Topics)

XV (/Tags/535/Topics)

Yellow Brick Road [1] (/Tags/784/Topics)

Zappy [1] (/Tags/107/Topics)

↳ 7 ↻ 0 ⚡ 7

(https://profile.intra.42.fr/users/mtaylor)

mtaylor (<https://profile.intra.42.fr/users/mtaylor>)
This transformation is pretty good, but it results in a "backwards" string "42", but the text is reversed.)

To fix this, invert the + and -:

```
new_x = (x + y) * cos(angle);
new_y = (x - y) * sin(angle) - z;
```

↳ 2 ↻ 0 ⚡ 2

(https://profile.intra.42.fr/users/vbrazhni)

Altruist vbrazhni (<https://profile.intra.42.fr/users/vbrazhni>)
It depends only on your realization of reading and storage.

correct image after projection, someone will get a reverse
You are completely right that it is simply to fix. You can correct (changing sign before x, y or z) to reverse axis direction. ✓

The format of formulas, that are listed here, is the best for a perfect result.

↳ 7 ↻ 0 ⚡ 7

(https://profile.intra.42.fr/users/mtaylor)

mtaylor (<https://profile.intra.42.fr/users/mtaylor>)
Slanting right:

```
new_x = (x + y) * cos(angle);
new_y = (x - y) * sin(angle) - z;
```

Slanting left:

```
new_x = (x - y) * -cos(angle);
new_y = ((x + y) * sin(angle)) - z;
```

Mirror image slanting right:

```
new_x = (x - y) * cos(angle);
new_y = ((x + y) * sin(angle)) - z;
```

Mirror image slanting left:

```
new_x = (x + y) * -cos(angle);
new_y = ((x - y) * sin(angle)) - z;
```



cfargere
(<https://profile.intra.42.fr/users/cfargere>)
Interestingly, the rotation matrix shown here are reversed from the scratchpi:
(<http://www.scratchapixel.com/lessons/mathematics-physics-for-computers-programmers/reverse-matrix>)



cyuriko
(<https://profile.intra.42.fr/users/cyuriko>)
Most helpful, thanks!

0
0
(https://profile.intra.42.fr/users/bshara)


0
0
(https://profile.intra.42.fr/users/jmacgyve)

1
0
(https://profile.intra.42.fr/users/samymone)
very helpful, thanks!

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