Rapport de projet: Phase 5

```
md" # Rapport de projet: Phase 5"
```

Équipe: Elahe Amiri et Louis-Philippe Proulx

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```

Lien Github du code: **Branche Phase 5 du projet**

```
md"Lien Github du code: [Branche Phase 5 du projet]
(https://github.com/louproul/mth6412b-starter-code.git)"
```

Il y a une réplique du code dans "projet\phase5\main.jl"

```
md" Il y a une réplique du code dans \"projet\phase5\main.jl\""
```

Toute les combinaisons sont testés "projet\phase5\best*parameters*search.jl"

```
md" Toute les combinaisons sont testés \"projet\phase5\best_parameters_search.jl\""
```

```
using Random, FileIO, Images, ImageView, ImageMagick
```

```
reconstruct_image (generic function with 5 methods)
```

```
begin
include("../display.jl")
include("../node.jl")
include("../edge.jl")
include("../graph.jl")

include("../phase3/marked_node.jl")
include("../phase3/marked_edge.jl")
include("../phase3/marked_graph.jl")
include("../phase3/Prime_Alg.jl")
include("../phase3/kruskal_Alg.jl")

include("../phase4/one_tree.jl")
include("../phase4/TSP_hk.jl")
include("../phase4/TSP_rsl.jl")

include("read_stsp_new.jl")
include("tools.jl")
include("reconstruct_img.jl")
end
```

Voici la fonction principale qui permet de créeer les images reconstruites

```
md" ## Voici la fonction principale qui permet de créeer les images reconstruites"
```

```
function reconstruct_image(filename_stsp::String, view::Bool=false, MST_Algorithm=1, step_method
=3, nb_iteration=10)
    root = normpath(joinpath(@__FILE__,"..","..",".."))
    filepath_to_stsp = "instances\\tsp\\instances"
    filepath = joinpath(root, filepath_to_stsp)
    filepath = joinpath(filepath, filename_stsp * ".tsp")

    """Reading data form data files"""
    header = read_img_header(filepath)
    graph_nodes, graph_edges, edges_weight = read_img_stsp(filepath)

    #creating the main graph
    Main_Graph = MarkedGraph("Graph_image", MarkedNode{Array{Float64,1}}[], MarkedEdge{Array{Flo
at64,1}}[])
    create_img_Graph!(Main_Graph, graph_nodes, graph_edges, edges_weight)

    # solving the TSP problem using Held and Karp algorithm
    W2, HK_Graph = HK_MST(Main_Graph, MST_Algorithm, Main_Graph.nodes[1], step_method, nb_iterat
ion) # method::Int64=0, t_step::Float64 = -1.0, stop_method::Int64 = 0)

    New_TSP, tour_W = create_tour!(deepcopy(HK_Graph), Main_Graph, W2)
    println("The weight of TSP Tour: ", tour_W)


    start_e = New_TSP.edges[findall(x->x.adjacentnodes[1].name == "1", New_TSP.edges)][1]
    Edge_list = create_touredge_list!(New_TSP, start_e)
    node_tour = Tour_nodes_list(New_TSP)

    path_name_tour = joinpath(normpath(joinpath(@__FILE__,"..")),"tour_and_reconstructed_image",
"tour_" * filename_stsp * ".tour")
    write_tour(path_name_tour, node_tour, convert(Float32, tour_W))
    inputpath_to_stsp = "instances\\images\\shuffled"

    inputpath = joinpath(root, inputpath_to_stsp)

    inputpath_to_shuffle_image = joinpath(inputpath, filename_stsp * ".png")
    path_reconstructed_image = joinpath(normpath(joinpath(@__FILE__,"..")),"tour_and_reconstruct
ed_image", "construted_" * filename_stsp * ".png")
    reconstruct_picture(path_name_tour, inputpath_to_shuffle_image, path_reconstructed_image, vi
ew)

    return(tour_W)

end
```

```
display("reconstruct_img.jl",22,59)
```

path_to_original_and_constructed (generic function with 1 method)

```
function path_to_original_and_constructed(filename_stsp)
    root = normpath(joinpath(@__FILE__,"..","..",".."))
    inputpath_to_stsp = "instances\\images\\original"
    inputpath = joinpath(root, inputpath_to_stsp)
    inputpath_to_original_image = joinpath(inputpath, filename_stsp * ".png")
    path_reconstructed_image =
  joinpath(normpath(joinpath(@__FILE__,"..")),"tour_and_reconstructed_image",
 "construted_" * filename_stsp * ".png")
```

```
    return(inputpath_to_original_image,path_reconstructed_image)
end
```

Example abstract-light-painting

```
md"### Example abstract-light-painting"
```

The best combination for instance abstract-light-painting

Step method number = 4 and number of iterations = 10

Total weight of best tour is 1.2310679e7

```
md"
The best combination for instance abstract-light-painting

Step method number = 4 and number of iterations = 10

Total weight of best tour is 1.2310679e7"
```

```
1.2310679e7
```

```
reconstruct_image("abstract-light-painting",false, 1, 4, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_alp,reconstructed_image_alp)=path_to_original_and_constructed("abstr
act-light-painting")
```

Image originale

```
md" ### Image originale"
```

- `load(original_image_alp)`

Image reconstruite

- `md" ### Image reconstruite"`

```
load(reconstructed_image_alp)
```

Example alaska-railroad

```
md"### Example alaska-railroad"
```

The best combination for instance alaska-railroad

Step method number = 4 and number of iterations = 10

Total weight of best tour is 7.663826e6

```
md"
The best combination for instance alaska-railroad

Step method number = 4 and number of iterations = 10

Total weight of best tour is 7.663826e6"
```

```
7.663826e6
```

```
reconstruct_image("alaska-railroad",false, 1, 4, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_ar,reconstructed_image_ar)=path_to_original_and_constructed("alaska-
railroad")
```

Image originale

```
md" ### Image originale"
```

- `load(original_image_ar)`

Image reconstruite

- `md" ### Image reconstruite"`

```
load(reconstructed_image_ar)
```

Example blue-hour-paris

```
md"### Example blue-hour-paris"
```

The best combination for instance blue-hour-paris

Step method number = 1 and number of iterations = 20

Total weight of best tour is 3.941921e6

```
md"
The best combination for instance blue-hour-paris

Step method number = 1 and number of iterations = 20

Total weight of best tour is 3.941921e6"
```

3.942935e6

```
reconstruct_image("blue-hour-paris",false, 1, 1, 20)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_bhp,reconstructed_image_bhp)=path_to_original_and_constructed("blue-hour-paris")
```

Image originale

```
md" ### Image originale"
```

```
load(original_image_bhp)
```

Image reconstruite

```
md" ### Image reconstruite"
```

```
load(reconstructed_image_bhp)
```

Example lower-kananaskis-lake

```
md"### Example lower-kananaskis-lake"
```

The best combination for instance lower-kananaskis-lake

Step method number = 4 and number of iterations = 10

Total weight of best tour is 4.222666e6

```
md"
The best combination for instance lower-kananaskis-lake

Step method number = 4 and number of iterations = 10

Total weight of best tour is 4.222666e6"
```

```
4.222666e6
```

```
reconstruct_image("lower-kananaskis-lake",false, 1, 4, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_lkl,reconstructed_image_lkl)=path_to_original_and_constructed("lower-kananaskis-lake")
```

Image originale

```
md" ### Image originale"
```

```
load(original_image_lkl)
```

Image reconstruite

```
md" ### Image reconstruite"
```

```
load(reconstructed_image_lkl)
```

Example marlet2-radio-board

```
md"### Example marlet2-radio-board"
```

The best combination for instance marlet2-radio-board

Step method number = 1 and number of iterations = 20

Total weight of best tour is 8.823499e6

```
md"
The best combination for instance marlet2-radio-board

Step method number = 1 and number of iterations = 20

Total weight of best tour is 8.823499e6"
```

8.823499e6

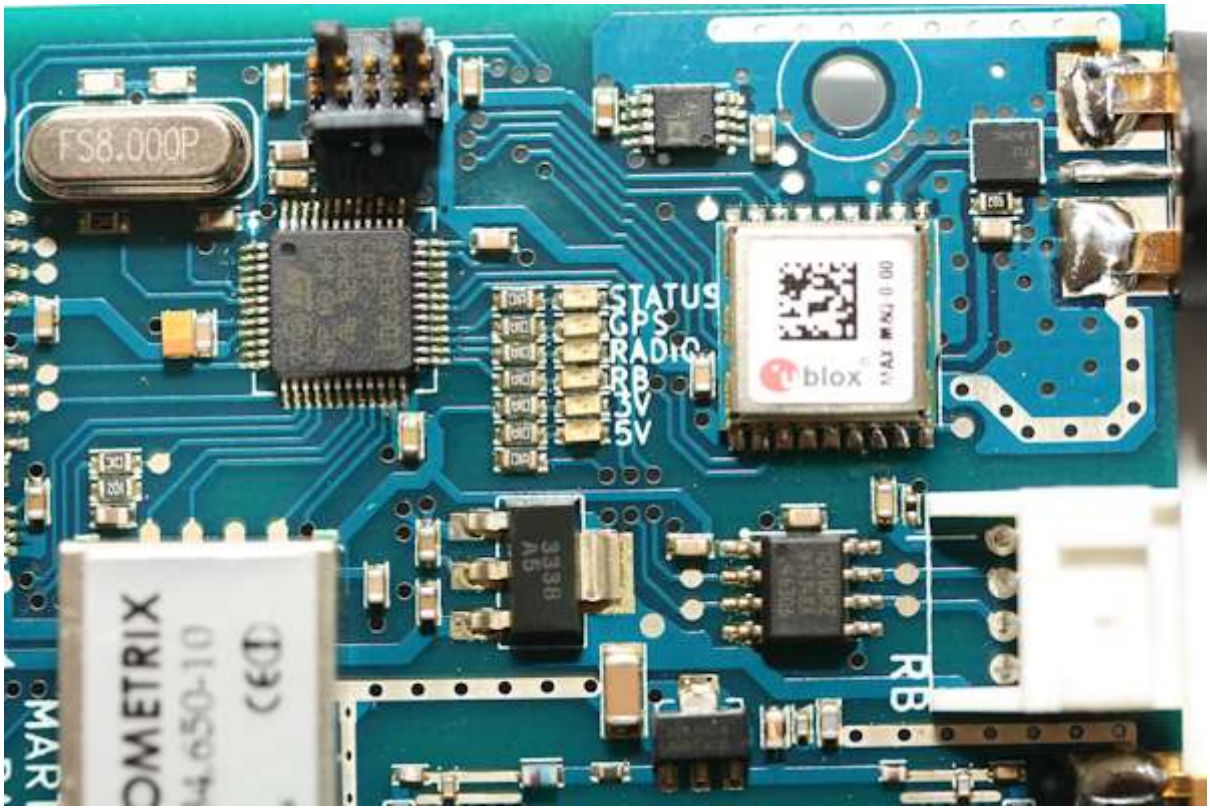
```
reconstruct_image("marlet2-radio-board",false, 1, 1, 20)
```

("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s

```
(original_image_mrb,reconstructed_image_mrb)=path_to_original_and_constructed("marle
t2-radio-board")
```

Image originale

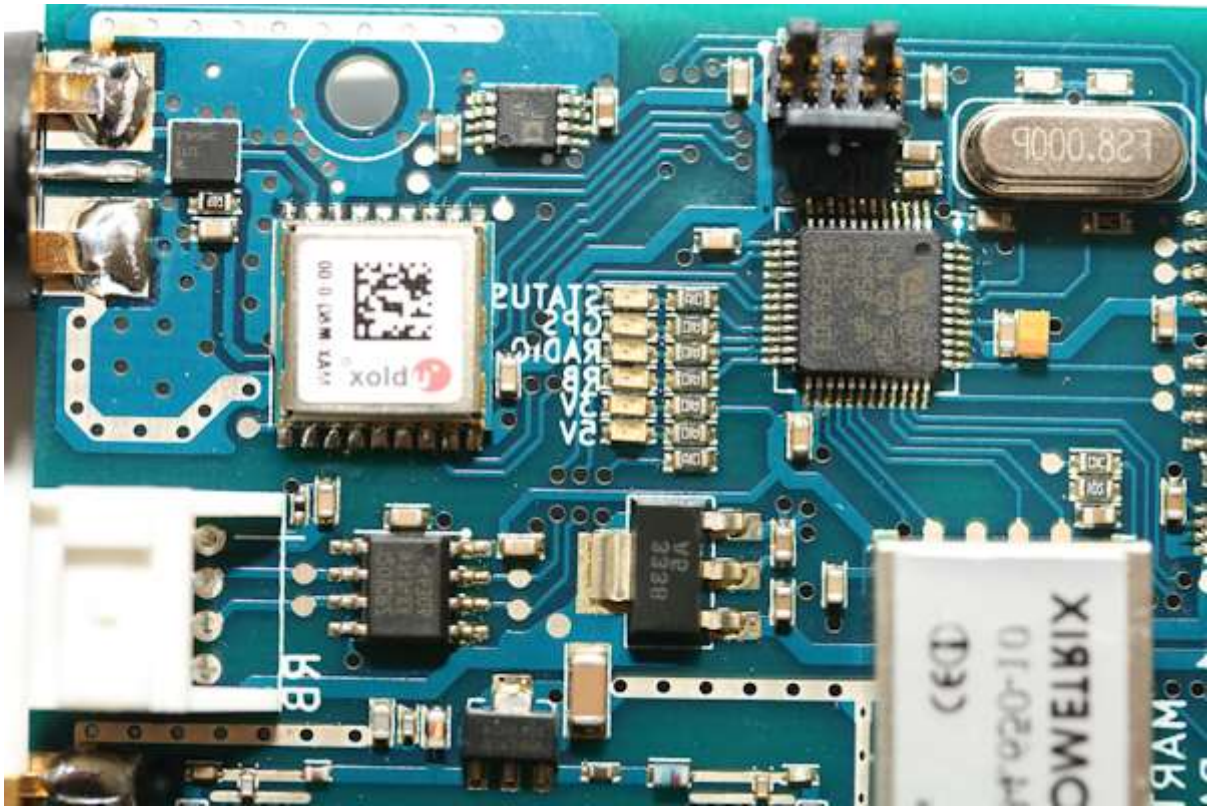
- `md" ### Image originale"`



- `load(original_image_mrb)`

Image reconstruite

- `md" ### Image reconstruite"`



- load(reconstructed_image_mrb)

Example nikos-cat

- md"### Example nikos-cat"

- md"
- The best combination for instance nikos-cat
-
- Step method number = 1 and number of iterations = 10
-
- Total weight of best tour is 3.035828e6"

3.036227e6

- reconstruct_image("nikos-cat",false, 1, 1, 10)

("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s

- (original_image_nc,reconstructed_image_nc)=path_to_original_and_constructed("nikos-cat")

Image originale

- md" ### Image originale"

- `load(original_image_nc)`

Image reconstruite

- `md" ### Image reconstruite"`

```
load(reconstructed_image_nc)
```

Example pizza-food-wallpaper

```
md"### Example pizza-food-wallpaper"
```

The best combination for instance pizza-food-wallpaper

Step method number = 4 and number of iterations = 10

Total weight of best tour is 5.037248e6

```
md"
The best combination for instance pizza-food-wallpaper

Step method number = 4 and number of iterations = 10

Total weight of best tour is 5.037248e6"
```

5.037248e6

```
reconstruct_image("pizza-food-wallpaper",false, 1, 4, 10)
```

("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s

```
(original_image_pfw,reconstructed_image_pfw)=path_to_original_and_constructed("pizza
-food-wallpaper")
```

Image originale

```
md" ### Image originale"
```

- `load(original_image_pfw)`

Image reconstruite

- `md" ### Image reconstruite"`

- `load(reconstructed_image_pfw)`

Example the-enchanted-garden

```
md"### Example the-enchanted-garden"
```

The best combination for instance the-enchanted-garden

Step method number = 4 and number of iterations = 10

Total weight of best tour is 1.9910312e7

```
md"
The best combination for instance the-enchanted-garden

Step method number = 4 and number of iterations = 10

Total weight of best tour is 1.9910312e7"
```

```
1.9910312e7
```

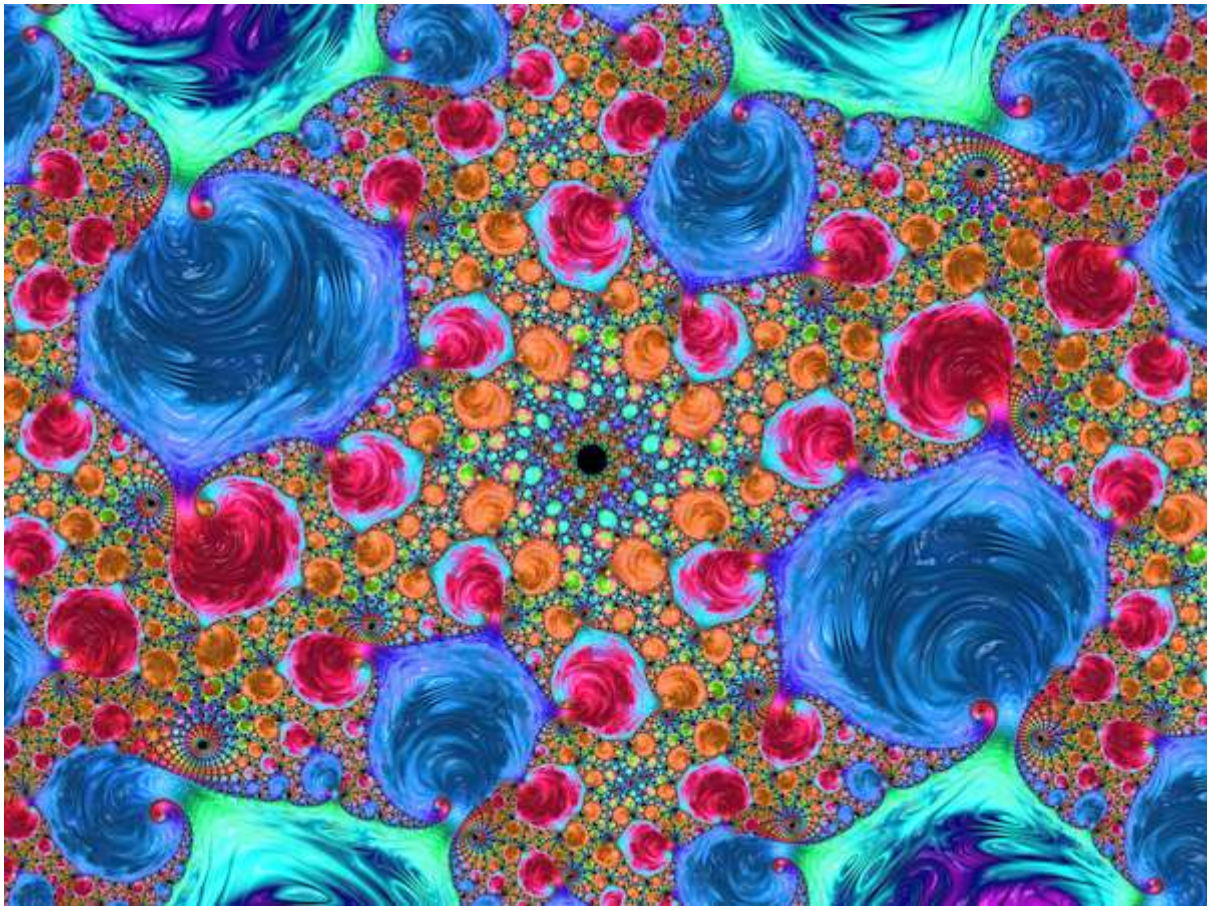
```
reconstruct_image("the-enchanted-garden",false, 1, 4, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_teg,reconstructed_image_teg)=path_to_original_and_constructed("the-
enchanted-garden")
```

Image originale

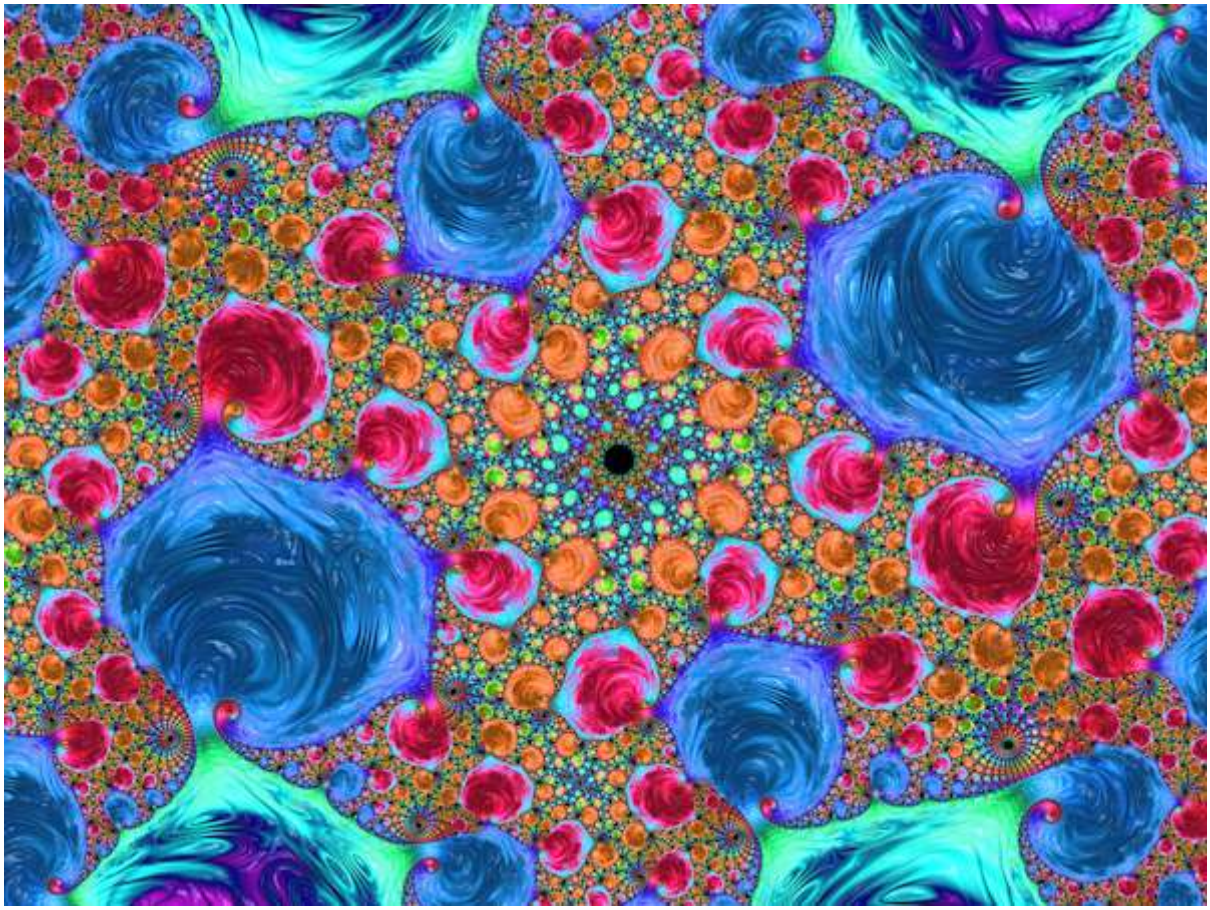
```
md" ### Image originale"
```



- `load(original_image_teg)`

Image reconstruite

- `md" ### Image reconstruite"`



```
load(reconstructed_image_teg)
```

Example tokyo-skytree-aerial

```
md"### Example tokyo-skytree-aerial"
```

The best combination for instance tokyo-skytree-aerial

Step method number = 4 and number of iterations = 10

Total weight of best tour is 1.360595e7

```
md"
The best combination for instance tokyo-skytree-aerial

Step method number = 4 and number of iterations = 10

Total weight of best tour is 1.360595e7"
```

```
1.360595e7
```

```
reconstruct_image("tokyo-skytree-aerial",false, 1, 4, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_tsa,reconstructed_image_tsa)=path_to_original_and_constructed("tokyo-skytree-aerial")
```

Image originale

```
md" ### Image originale"
```

```
load(original_image_tsa)
```

Image reconstruite

```
md" ### Image reconstruite"
```

```
load(reconstructed_image_tsa)
```

```
Enter cell code...
```