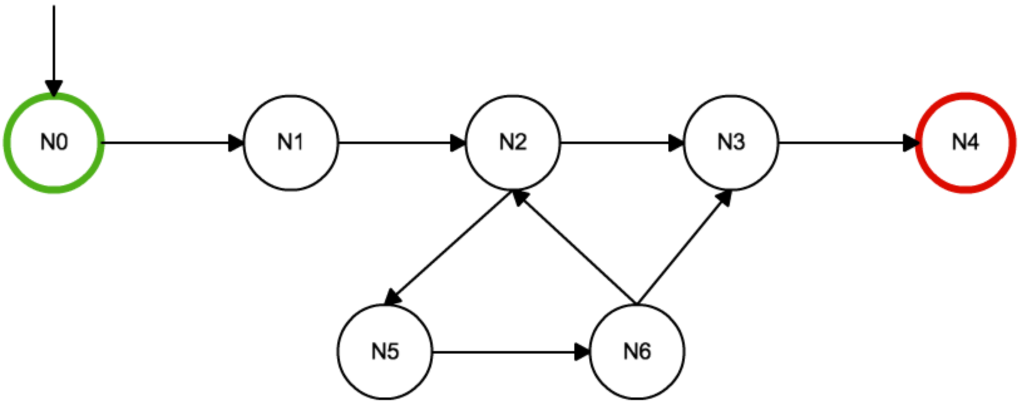
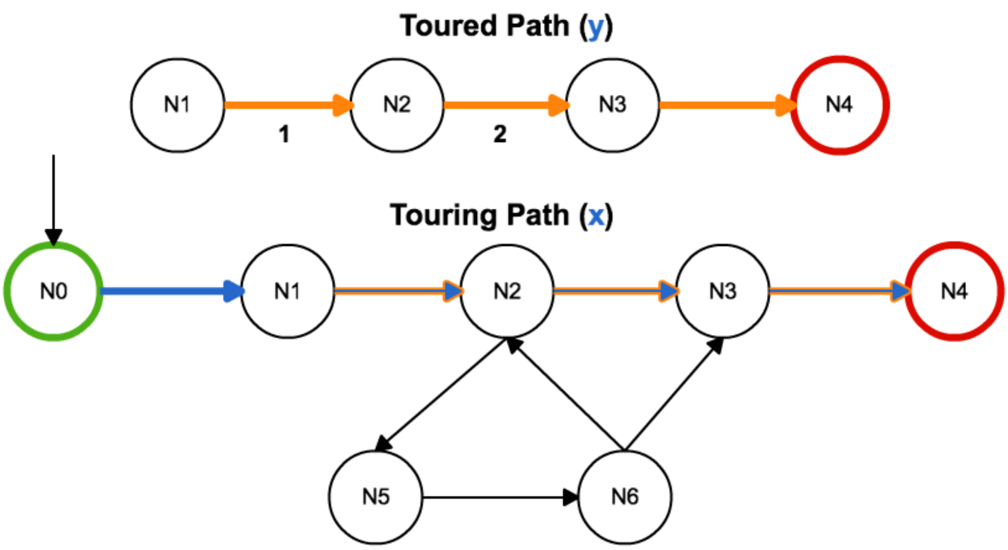
Touring

The following diagram will be used to explain touring and its three main forms.



Basic Touring

Path ***x*** tours path ***y*** if path ***y*** is a sub-path of path ***x***. Basically meaning that one path tours another if the path being toured is a sub-path. Such that path [n_0, n_1, n_2, n_0, n_3] tours the path [n_1, n_2, n_0], since it's a sub-path. The following diagram is an example of this, with the path being toured illustrated in orange (***y***) and the path touring it being illustrated in blue (***x***), using both colours to illustrate the overlap.



Touring with Side-trips

Path ***x*** tours path ***y*** with side-trips if the *edges* within ***y*** appear in ***x*** in the exact same order, regardless of any other edges appearing in between.

Basically as long as the edges of the path being toured (***y***) appear within the path touring it (***x***) in the exact same order, regardless of any new additional edges in-between them, then the path is toured with a side-trip.

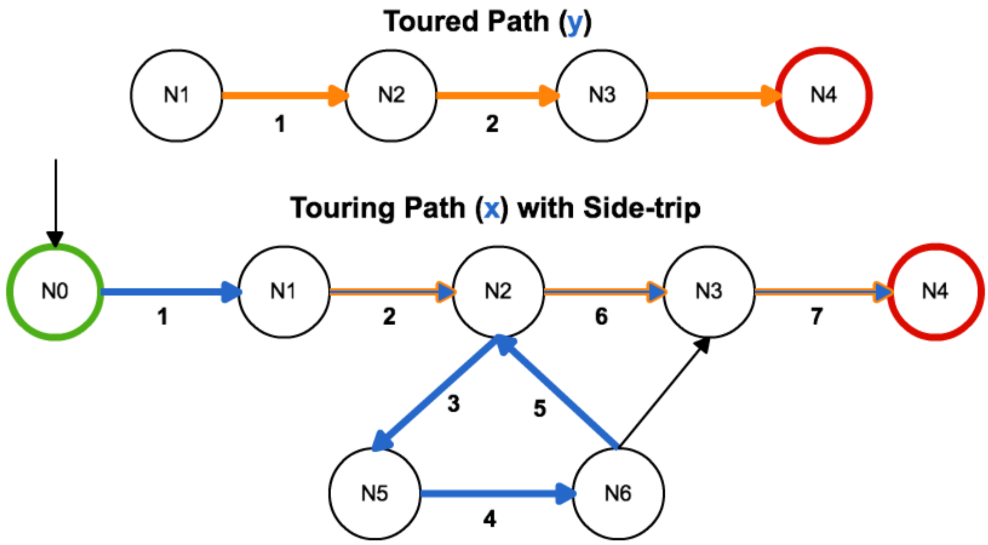
You can have multiple side-trips during a single tour.

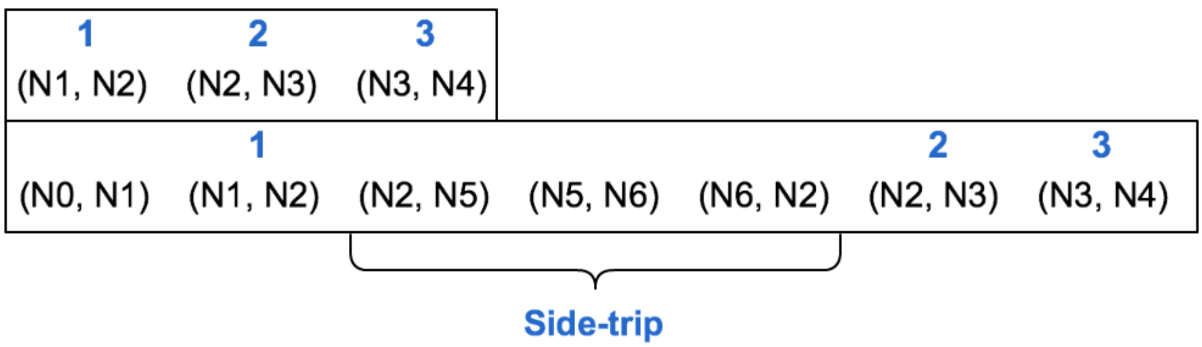
For example, in the below diagram we have the toured path (***y***) with the edges **{**(N1, N2), (N2, N3), (N3, N4)**}**. In order to tour this path, our path (***x***) needs to traverse across each of these edges in the exact same order that they appear.

What this means is that we cannot go from (N1, N2) to (N3, N4) because then we are skipping the edge (N2, N3), which should appear second. Similarly, we cannot start from (N2, N3), because then we are missing (N1, N2) which must appear first. Finally, we cannot go from edge (N2, N3) to (N2, N3), because then that edge is in the second and third place, whereas the third edge should be (N3, N4).

In the diagram below, the path which tours this path with a side-trip is in blue. It consists of the following edges: **{**(N0, N1), **(N1, N2)**, (N2, N5), (N5, N6), (N6, N2), **(N2, N3)**, **(N3, N4)****}**.

As you can see from the edges, the ones that also appear within ***y*** do so in the same order, so therefore ***x*** tours ***y*** with a side trip consisting of the edges **{**(N2, N5), (N5, N6), (N6, N2)**}**.



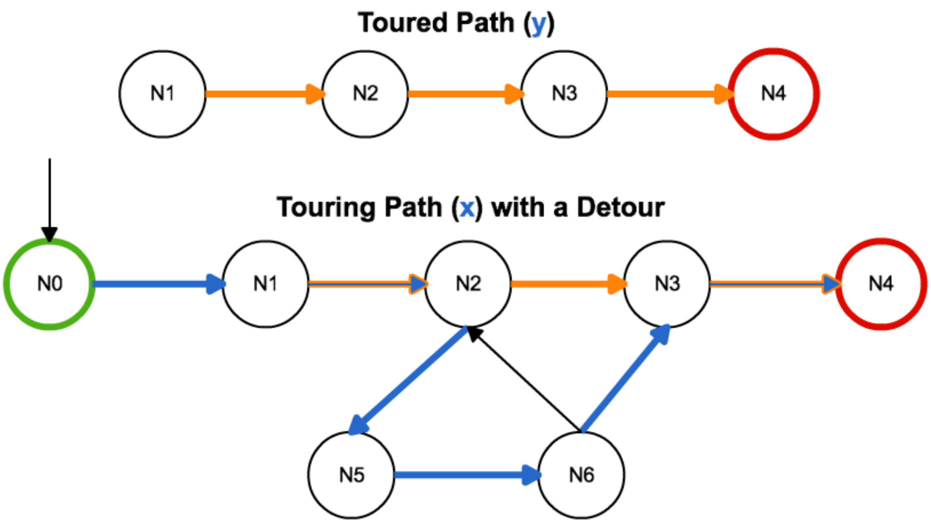


Touring with Detours

Path ***x*** tours path ***y*** with a detour if the *nodes* within ***y*** appear in ***x*** in the exact same order, regardless of any other nodes appearing in between.
Basically as long as the nodes of the path being toured (***y***) appear within the path touring it (***x***) in the exact same order, regardless of any new additional nodes in-between them, then the path is toured with a detour.
You can have multiple detours during a single tour.

For example, in the below diagram we have the toured path (***y***) with the nodes **{**N1, N2, N3, N4**}.** In order to tour this path, our path (***x***) needs to traverse across each of these nodes in the exact same order that they appear.
What this means is that we cannot go from node N2 to N4 because then we are skipping node N3 which should appear third. Similarly, we cannot go from N2 to N2 since this would mean that N2 will appear second and third, whereas the third node should be N3.

In the diagram below, the path which tours this path with a detour is in blue. It consists of the following nodes: **{**N0, **N1**, **N2**, N5, N6, **N3**, **N4}**.
As you can see from the nodes, the ones that also appear within ***y*** do so in the same order, so therefore ***x*** tours ***y*** with a detour consisting of the nodes **{**N5, N6**}.**



1	2	3	4
N1	N2	N3	N4

	1	2			3	4
N0	N1	N2	N5	N6	N3	N4

$\underbrace{\text{N5 N6}}_{\text{Detour}}$

Detour

1	2	3	4
N1	N2	N3	N4

	1	2			3	4	5?
N0	N1	N2	N5	N6	N2	N3	N4

The third node should be N3 but it is N2, therefore the path is out of order and this is not a detour.