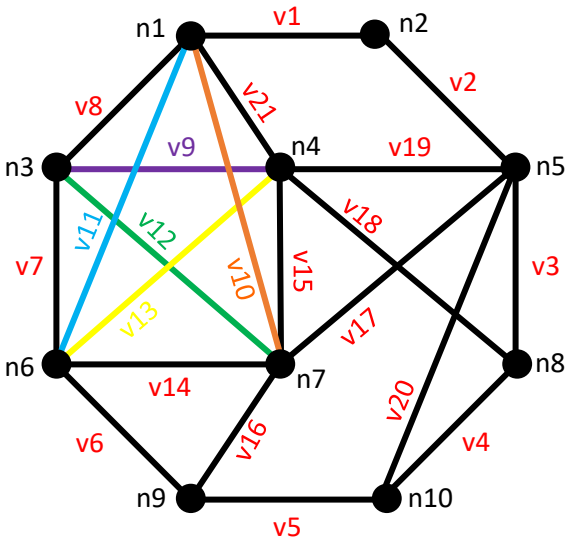
N-coloring of a graph

PDP – Project

Sequential Algorithm (Greedy Coloring)

Step by step description:



Step 1
- choose node **n1**
- *color* node **n1** with the first color (**red**)

Step 2
- choose the *next* node **n2**
- *check* if it's a *neighbor* of the previous node **n1** – ☑
- *color* node **n2** with the next color unused (**pink**)

Step 3
- choose the *next* node **n3**
- *check* if it's a *neighbor* of node **n1** – ☑
- *check* if it's a neighbor of node **n2** – ☒
- *color* node **n3** with the color of **n2** (**pink**)

Step 4
- choose the *next* node **n4**
- *check* if it's a *neighbor* of node n1 – ☑ (**red**)
- *check* if it's a *neighbor* of node **n2** – ☒ (**pink**)
- *check* if it's a *neighbor* of node **n3** – ☑ (**pink**)
- *color* node **n4** with the color of **n2** (**blue**)

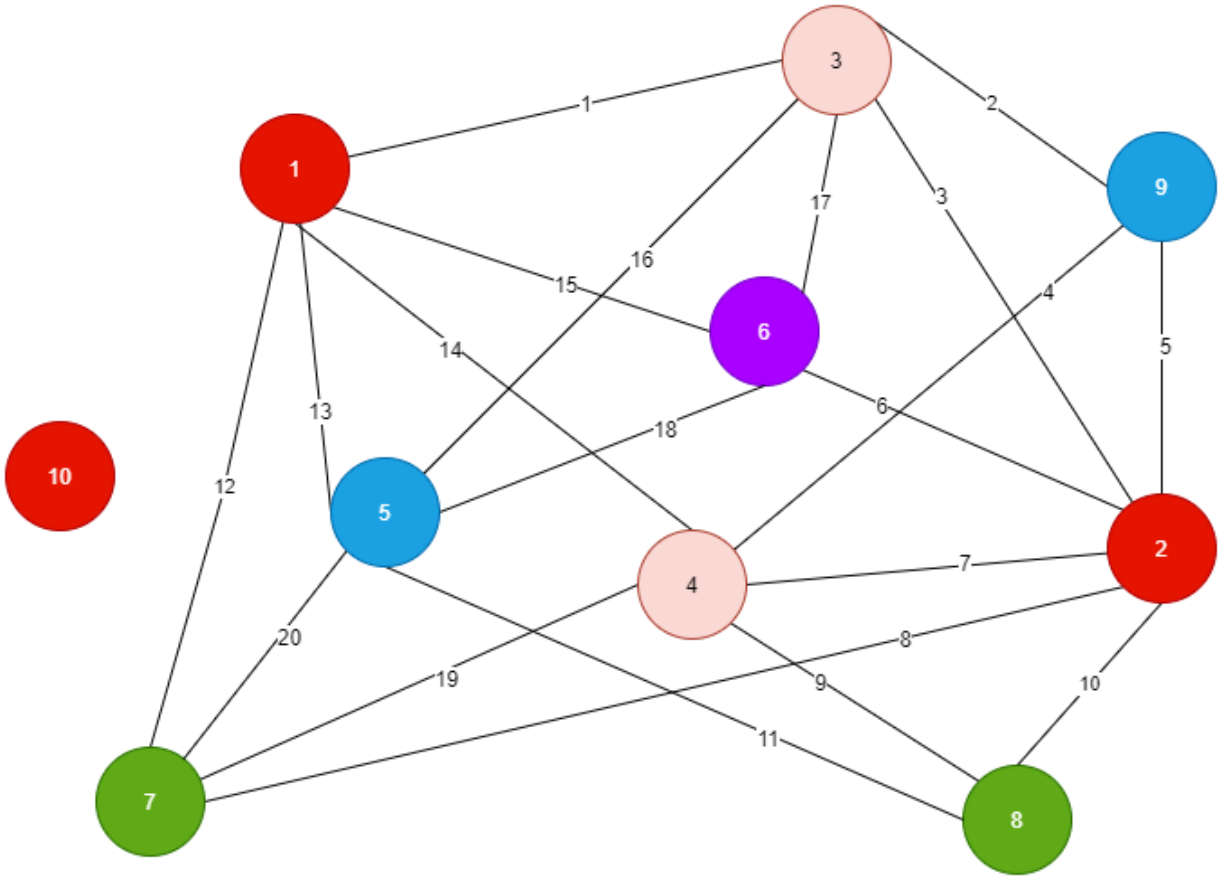
Step 5
- choose the *next* node **n5**
- *check* if it's a *neighbor* of node **n1** – ☒ (**red**)
- *check* if it's a *neighbor* of node **n2** – ☑ (**pink**)
- *check* if it's a *neighbor* of node **n3** – ☒ (**pink**)
- *check* if it's a *neighbor* of node **n4** – ☑ (**blue**)
- *color* node **n5** with the color of **n1** (**red**)

so on and so forth….

The program runs in 0.0 seconds on the example presented previously by using *sequential calls*.

The program runs in 0.032 seconds on the example presented previously by using a *thread pool*.

The program runs in … seconds on the example presented previously by using MPI.



graph image

One resulted graph generated randomly.

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graph generated

```
End work coloring: 0.0 seconds
    ... 1 ... 2 ... 3 ... 4 ... 5 ... 6 ... 7 ... 8 ... 9 ...10...
 1 | --- 0 --- 0 --- 1 --- 1 --- 1 --- 1 --- 1 --- 0 --- 0 --- 0--- |Red - 1
 2 | --- 0 --- 0 --- 1 --- 1 --- 0 --- 1 --- 1 --- 1 --- 1 --- 0--- |Red - 2
 3 | --- 1 --- 1 --- 0 --- 0 --- 1 --- 1 --- 0 --- 0 --- 1 --- 0--- |Pink - 3
 4 | --- 1 --- 1 --- 0 --- 0 --- 0 --- 0 --- 1 --- 1 --- 1 --- 0--- |Pink - 4
 5 | --- 1 --- 0 --- 1 --- 0 --- 0 --- 1 --- 1 --- 1 --- 0 --- 0--- |Blue - 5
 6 | --- 1 --- 1 --- 1 --- 0 --- 1 --- 0 --- 1 --- 1 --- 0 --- 0--- |Purple - 6
 7 | --- 1 --- 1 --- 0 --- 1 --- 1 --- 1 --- 0 --- 0 --- 0 --- 0--- |Green - 7
 8 | --- 0 --- 1 --- 0 --- 1 --- 1 --- 1 --- 0 --- 0 --- 0 --- 0--- |Green - 8
 9 | --- 0 --- 1 --- 1 --- 1 --- 0 --- 0 --- 0 --- 0 --- 0 --- 0--- |Blue - 9
10 | --- 0 --- 0 --- 0 --- 0 --- 0 --- 0 --- 0 --- 0 --- 0 --- 0--- |Red - 10
```