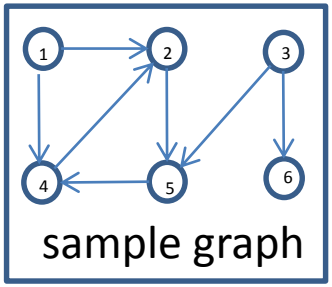
Lamriben Nabil DFS project presentation for Wayfair

The following slides will show you a step by step implementation of a depth first search on a directed graph.



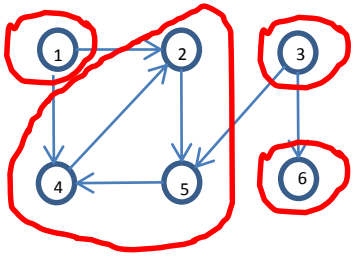
Our sample graph must be represented as a text file in the following format:

```
1: 2, 4
2: 5
3: 5, 6
4: 2
5: 4
6: 6
```

Where each node is followed by a colon, and followed by a list of nodes to which it points.

The output of my application will be a text file showing the groups of strongly connected nodes which form “forests”

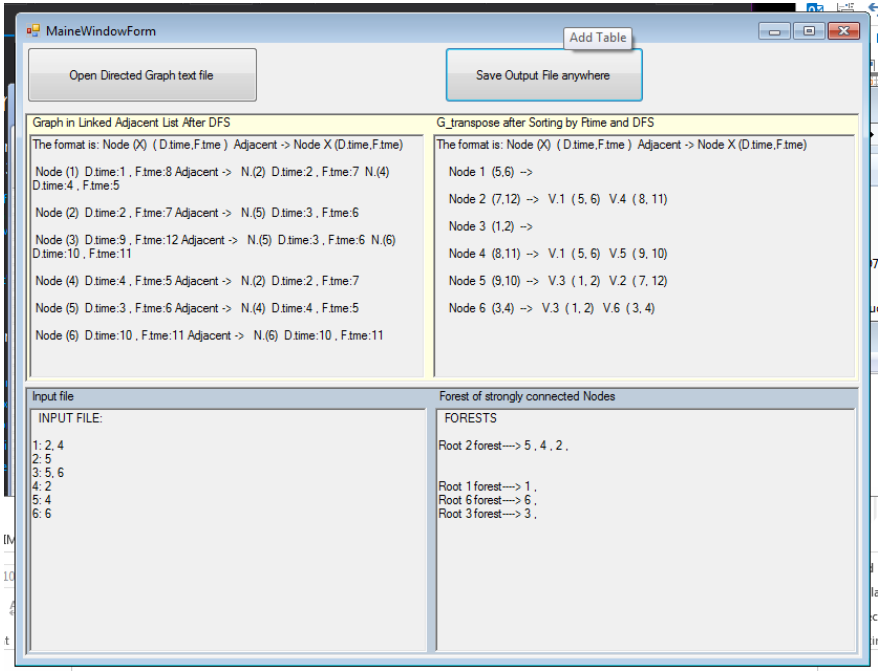
```
list of strongly connected nodes at root 2
5 , 4 , 2 ,

list of strongly connected nodes at root 1
1 ,
list of strongly connected nodes at root 6
6 ,
list of strongly connected nodes at root 3
3 ,
```



DFS project presentation for Wayfair

How to use the application:

1. Open the Bin folder and launch the “AlgoApp”
2. Click on the large “Open Directed Graph text file” button
3. Locate the “Sample_Graph_1” text file located in the Bin folder … and watch the magic ☺
4. The output file can also be saved anywhere



DFS project presentation for Wayfair

Step by step through the recursive algorithm and my datastrcuture.

DFS fuction

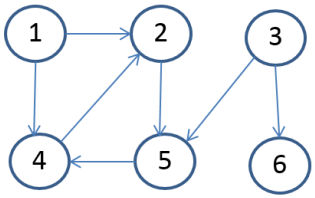
```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (   U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

```
                DFSVISIT(Vertex_withColor[]U, _____) {
 U[_].color = GRAY
  T++; = _
 U[_].Td =  T ;
 U[_].WasVisited = true;
```

```
for (unVoisin V_ = U[_] ## ____ → _____ → _____ → _____ →
    if (   U[_].color == white?)
                U[_].pi←  _  ;
                DFSVISIT( U ,  _ );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

Array of linked lists

	U	V	V
0	Id= 0 TD= TF= π =99999 V ADJ ---→		
1	Id= 1 TD= TF= π =99999 V ADJ ---→	2	4
2	Id= 2 TD= TF= π =99999 V ADJ ---→	5	
3	Id= 3 TD= TF= π =99999 V ADJ ---→	5	6
4	Id= 4 TD= TF= π =99999 V ADJ ---→	2	
5	Id= 5 TD= TF= π =99999 V ADJ ---→	4	
6	Id= 6 TD= TF= π =99999 V ADJ ---→	6	

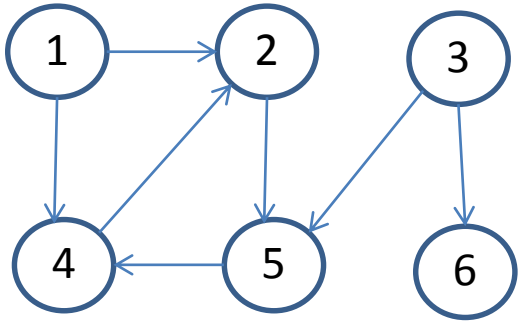


The direted graph at each stage of the traversal

```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

```
DFSVISIT(Vertex_withColor[]U, _____) {
 U[_].color = GRAY
  T++; = _
U[_].Td =  T ;
U[_].WasVisited = true;
for (unVoisin V_ = U[_] ## ____ → _____ → _____ → _____ →
    if (  U[_].color == white?)
                U[_].pi←  _  ;
                DFSVISIT( U ,  _ );
            T++;
            U[_].TF = T;
            U[_].Isterminated = true;
```

	U	V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= π =99999 TF= V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= π =99999 TF= V ADJ ---→	2	
5	Id= 5 TD= π =99999 TF= V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	

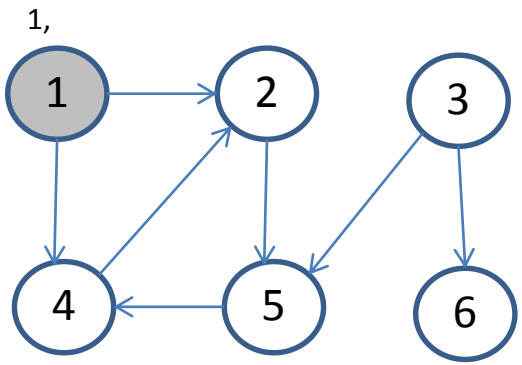


```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

1

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
U[1].WasVisited = true;

for (unVoisin V_ = U[_] ## ____ → _____→ _____ → _____→
    if (  U[_].color == white?)
                U[_].pi←  _  ;
                DFSVISIT( U , _ );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

U		V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π =99999 TD= TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π =99999 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	

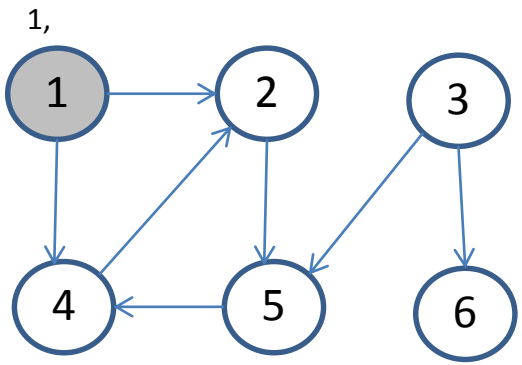


```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

1

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;

for (unVoisin V2 = U[1] ## _2__ → ___4___ → _____ →
    if (  U[2].color == white?)
                U[_].pi← 1 ;
                DFSVISIT( U , _ );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

U		V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π =99999 TD= TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π =99999 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	

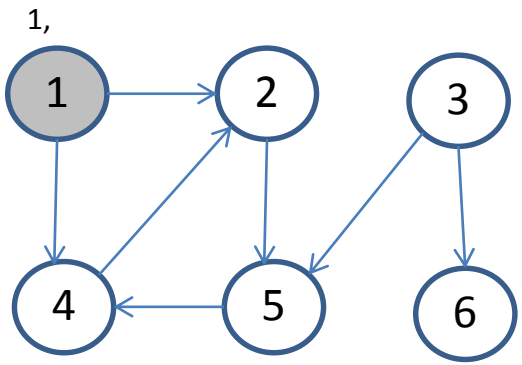


```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

1

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;

for (unVoisin V2 = U[1] ## _2__ → ___4___ → _____ →
    if (  U[2].color == white?)  YES
                U[2].pi←  1  ;
                DFSVISIT( U , _ );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

U		V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π =99999 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	

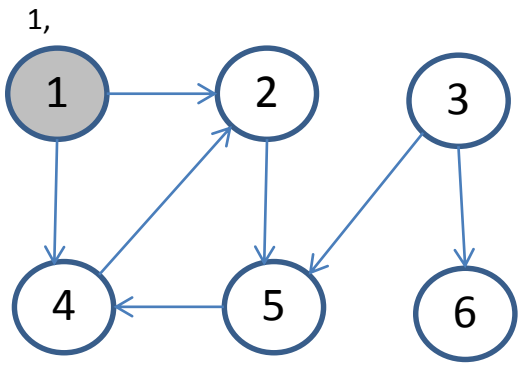


```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

1

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;

for (unVoisin V2 = U[1] ## _2__ → __4___ → _____ →
    if (  U[2].color == white?)  YES
                U[2].pi← 1 ;
                DFSVISIT( U , 2 );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

U		V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π =99999 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	

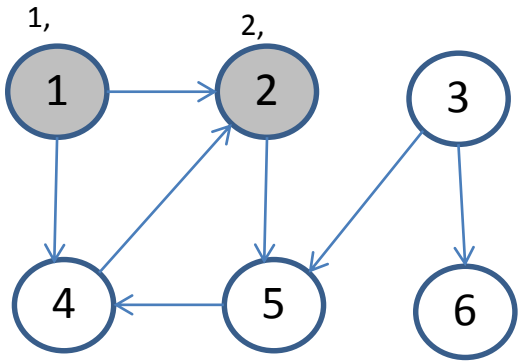


```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

```
DFSVISIT(Vertex_withColor[]U, ____2___) {
 U[2].color = GRAY
  T++; = 2
 U[2].Td = 2;
U[2].WasVisited = true;

for (unVoisin V_ = U[_] ## ___ → _____ → _____ →
    if (  U[_].color == white?)  ____
                U[_].pi←  _  ;
                DFSVISIT( U , _ );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π =99999 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

DFSVISIT(Vertex_withColor[]U, ____2___) {

U[2].color = *GRAY*

T++; = 2

U[2].Td = 2;

U[2].WasVisited = true;

for (unVoisin **V5** = U[2] ## _5__ → ____→ _____ →

if (U[_].color == white?) ____

U[_].pi← 2 ;

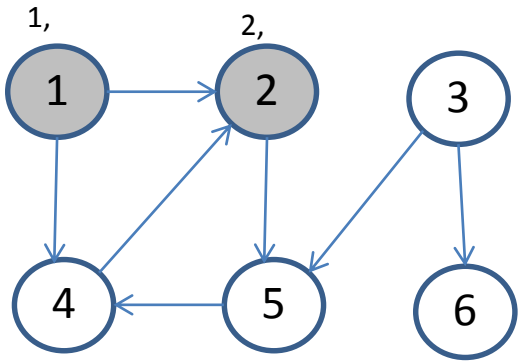
DFSVISIT(U , _);

T++;

U[_].TF = **T**;

U[_].Isterminated = true;

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π =99999 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

DFSVISIT(Vertex_withColor[]U, ____2___) {

U[2].color = *GRAY*

T++; = 2

U[2].Td = 2;

U[2].WasVisited = true;

for (unVoisin V5 = U[2] ## _5__ → _____ → _____ →

if (U[5].color == white?) YES

U[5].pi← 2 ;

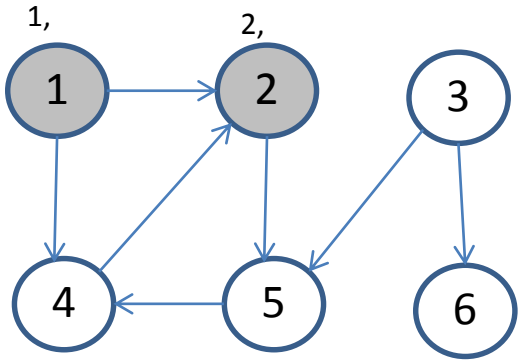
DFSVISIT(U , 5);

T++;

U[_].TF = T;

U[_].Isterminated = true;

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π→2 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



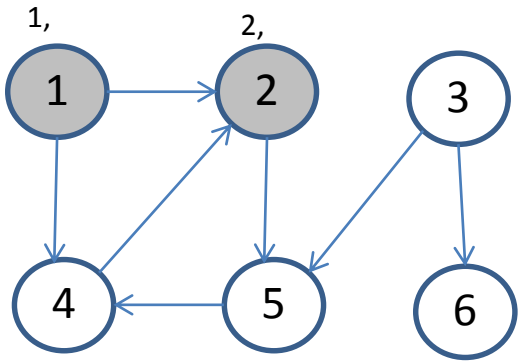
```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

```
DFSVISIT(Vertex_withColor[]U, ____2___) {
 U[2].color = GRAY
  T++; = 2
 U[2].Td = 2;
U[2].WasVisited = true;
```

```
for (unVoisin V5 = U[2] ## _5__ → _____→ _____ →
    if (  U[5].color == white?)  YES
                U[5].pi←  2  ;
                DFSVISIT( U , 5 );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π = 2 TD= TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



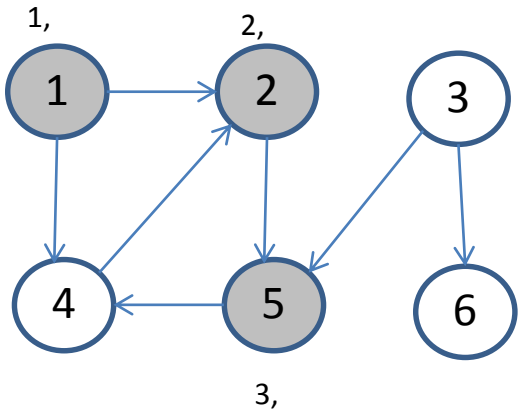
```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (   U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5

```
DFSVISIT(Vertex_withColor[]U, ____5___) {
 U[5].color = GRAY
  T++; = 3
 U[5].Td = 3 ;
U[5].WasVisited = true;

for (unVoisin V_ = U[_] ## ____ → _____ → _____ →
    if (   U[_].color == white?)  ____
                U[_].pi←  _  ;
                DFSVISIT( U , _ );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

U		V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π = 2 TD=3 TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5

DFSVISIT(Vertex_withColor[]U, ____5___) {

U[5].color = *GRAY*

T++; = 3

U[5].Td = 3 ;

U[5].WasVisited = true;

for (unVoisin **V4** = U[5] ## _4__ → ____ → _____ →

if (U[_].color == white?) _____

U[_].pi← 5 ;

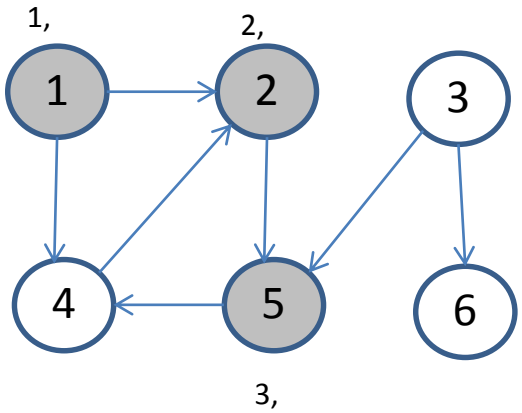
DFSVISIT(U , _);

T++;

U[_].TF = **T**;

U[_].Isterminated = true;

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =99999 TD= TF= V ADJ ---→	2	
5	Id= 5 π = 2 TD=3 TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (   U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

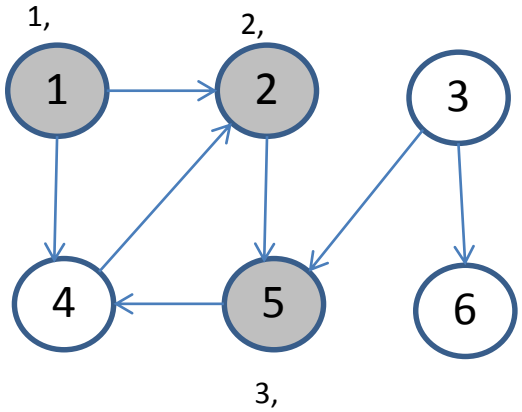
5

```
DFSVISIT(Vertex_withColor[]U, ____5___) {
 U[5].color = GRAY
  T++; = 3
 U[5].Td = 3 ;
U[5].WasVisited = true;
```

```
for (unVoisin V4 = U[5] ## _4__ → ____→ ____ →
    if (   U[4].color == white?)  _YES_
                U[4].pi← 5 ;
                DFSVISIT( U , 4 );
```

```
T++;
U[_].TF = T;
U[_].Isterminated = true;
```

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =5 TD= TF= V ADJ ---→	2	
5	Id= 5 π = 2 TD=3 TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (   U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2 5 4

DFSVISIT(Vertex_withColor[]U, ____4___) {

U[4].color = *GRAY*

T++; = 4

U[4].Td = 4 ;

U[4].WasVisited = true;

for (unVoisin V_ = U[_] ## ___ → ____ → ____ →

if (U[_].color == white?) ____

U[_].pi← _ ;

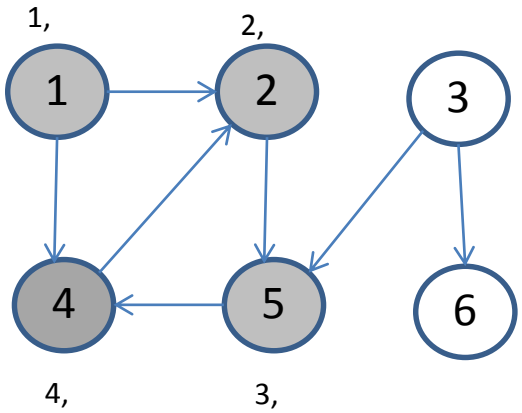
DFSVISIT(U , _);

T++;

U[_].TF = T;

U[_].Isterminated = true;

U			V	V
0	Id= 0 TD=	π =99999 TF=	V ADJ ---→		
1	Id= 1 TD= 1	π =99999 TF=	V ADJ ---→	2	4
2	Id= 2 TD= 2	π = 1 TF=	V ADJ ---→	5	
3	Id= 3 TD=	π =99999 TF=	V ADJ ---→	5	6
4	Id= 4 TD= 4	π =5 TF=	V ADJ ---→	2	
5	Id= 5 TD=3	π = 2 TF=	V ADJ ---→	4	
6	Id= 6 TD=	π =99999 TF=	V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2 5 4

DFSVISIT(Vertex_withColor[]**U**, ____**4**___) {

U[4].color = *GRAY*

T++; = 4

U[4].Td = 4 ;

U[4].WasVisited = true;

for (unVoisin **V2** = U[4] ## _2__ → ____ → _____ →

if (U[_].color == white?) ____

U[_].pi← _ ;

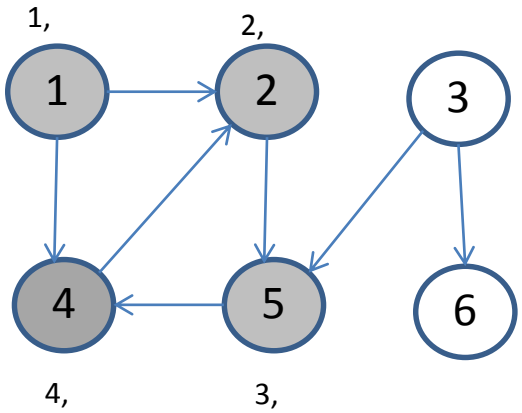
DFSVISIT(U , _);

T++;

U[_].TF = **T**;

U[_].Isterminated = true;

U			V	V
0	Id= 0 TD=	π =99999 TF=	V ADJ ---→		
1	Id= 1 TD= 1	π =99999 TF=	V ADJ ---→	2	4
2	Id= 2 TD= 2	π = 1 TF=	V ADJ ---→	5	
3	Id= 3 TD=	π =99999 TF=	V ADJ ---→	5	6
4	Id= 4 TD= 4	π =5 TF=	V ADJ ---→	2	
5	Id= 5 TD=3	π = 2 TF=	V ADJ ---→	4	
6	Id= 6 TD=	π =99999 TF=	V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5 4

DFSVISIT(Vertex_withColor[]U, ____4___) {

U[4].color = *GRAY*

T++; = 4

U[4].Td = 4 ;

U[4].WasVisited = true;

for (unVoisin V2 = U[4] ## _2__ → _____ → _____ →

if (U[2].color == white?) NO!

U[_].pi← _ ;

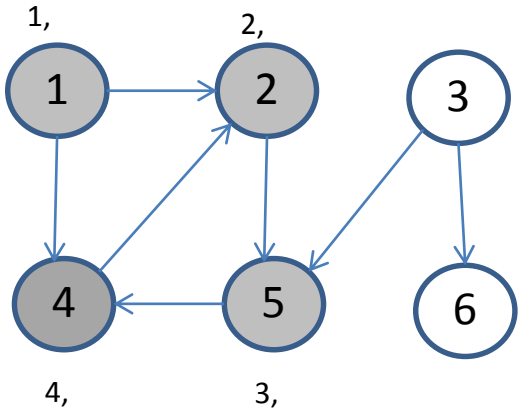
DFSVISIT(U , _);

T++;

U[_].TF = T;

U[_].Isterminated = true;

U			V	V
0	Id= 0 TD=	π =99999 TF=	V ADJ ---→		
1	Id= 1 TD= 1	π =99999 TF=	V ADJ ---→	2	4
2	Id= 2 TD= 2	π = 1 TF=	V ADJ ---→	5	
3	Id= 3 TD=	π =99999 TF=	V ADJ ---→	5	6
4	Id= 4 TD= 4	π =5 TF=	V ADJ ---→	2	
5	Id= 5 TD=3	π = 2 TF=	V ADJ ---→	4	
6	Id= 6 TD=	π =99999 TF=	V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5 4

DFSVISIT(Vertex_withColor[]U, ____4___) {

U[4].color = *GRAY*

T++; = 4

U[4].Td = 4 ;

U[4].WasVisited = true;

for (unVoisin V2 = U[4] ## _2__ → _____→ _____ →

if (U[2].color == white?) NO!_

U[_].pi← _ ;

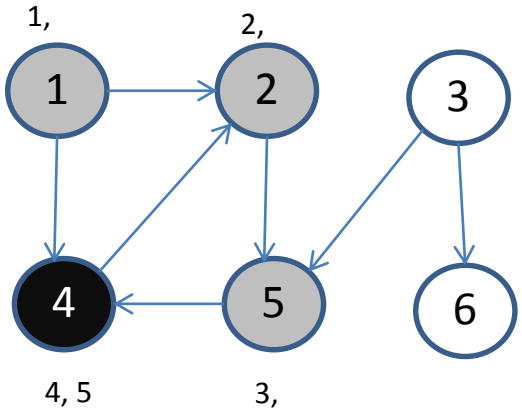
DFSVISIT(U , _);

T++; 4+1= 5

U[4].TF = 5;

U[4].Isterminated = true;

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =5 TD= 4 TF= 5 V ADJ ---→	2	
5	Id= 5 π = 2 TD=3 TF= V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5 4

DFSVISIT(Vertex_withColor[]U, ____4___) {

U[4].color = *GRAY*

T++; = 4

U[4].Td = 4 ;

U[4].WasVisited = true;

for (unVoisin V2 = U[4] ## _2__ → _____ → _____ →

if (U[2].color == white?) NO!

U[_].pi← _ ;

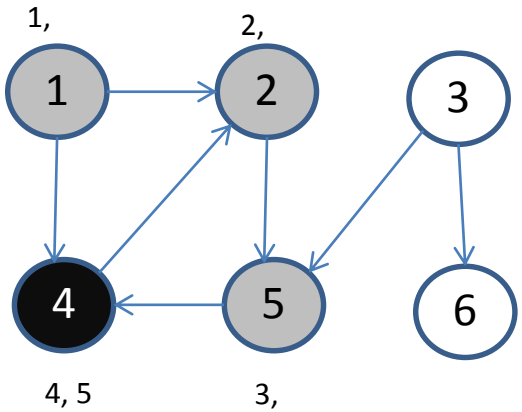
DFSVISIT(U , _);

T++; 4+1= 5

U[4].TF = 5;

U[4].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF= V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF= V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5 4

DFSVISIT(Vertex_withColor[]U, ____4____) {

U[4].color = *GRAY*

T++; = 4

U[4].Td = 4 ;

U[4].WasVisited = true;

for (unVoisin V2 = U[4] ## _2__ → _____→ _____ →

if (U[2].color == white?) NO!

U[_].pi← _ ;

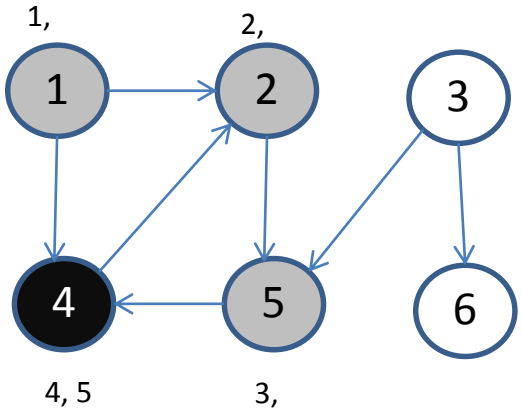
DFSVISIT(U , _);

T++; 4+1= 5

U[4].TF = 5;

U[4].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF= V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF= V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5

DFSVISIT(Vertex_withColor[]**U**, ____**5**___) {

U[5].color = *GRAY*

T++; = 3

U[5].Td = 3 ;

U[5].WasVisited = true;

for (unVoisin **V4** = U[5] ## _4__ → ____→ _____ →

if (U[4].color == white?) _YES_

U[4].pi← 5 ;

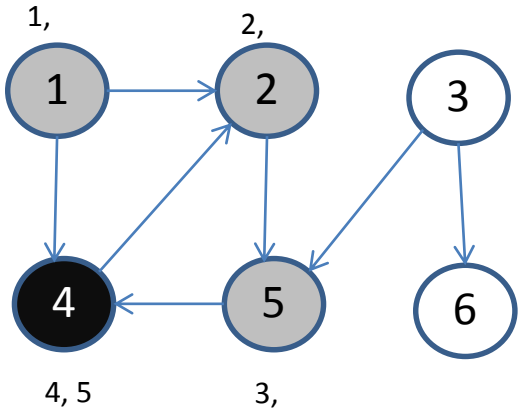
DFSVISIT(U , 4);

T++;

U[_].TF = **T**;

U[_].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF= V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF= V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (   U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5

DFSVISIT(Vertex_withColor[]**U**, ____**5**___) {

U[5].color = *GRAY*

T++; = 3

U[5].Td = 3 ;

U[5].WasVisited = true;

for (unVoisin **V4** = U[5] ## _4__ → ____→ _____ →

if (U[4].color == white?) _YES_

U[4].pi← 5 ;

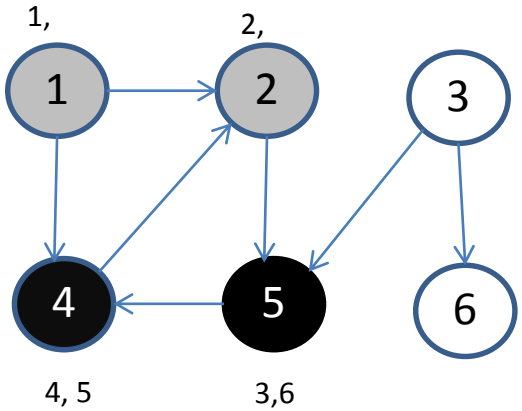
DFSVISIT(U , 4);

T++; =6

U[5].TF = **6**;

U[5].Isterminated = true;

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF= V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF= V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =5 TD= 4 TF= 5 V ADJ ---→	2	
5	Id= 5 π = 2 TD=3 TF=6 V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5

DFSVISIT(Vertex_withColor[]**U**, ____**5**___) {

U[5].color = *GRAY*

T++; = 3

U[5].Td = 3 ;

U[5].WasVisited = true;

for (unVoisin **V4** = U[5] ## _**4**__ → _____ → _____ →

if (U[4].color == white?) _YES_

U[4].pi← **5** ;

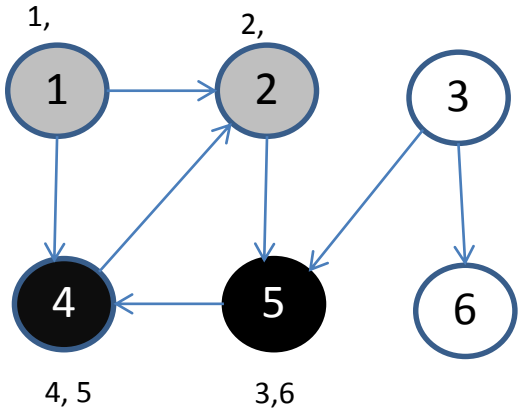
DFSVISIT(U , **4**);

T++; =6

U[5].TF = **6**;

U[5].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF= V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 **TF= 5** V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

5

DFSVISIT(Vertex_withColor[]**U**, ____**5**___)

U[5].color = *GRAY*

T++; = 3

U[5].Td = 3 ;

U[5].WasVisited = true;

for (unVoisin **V4** = U[5] ## _**4**__ → _____ → _____ →

if (U[4].color == white?) _YES_

U[4].pi← **5** ;

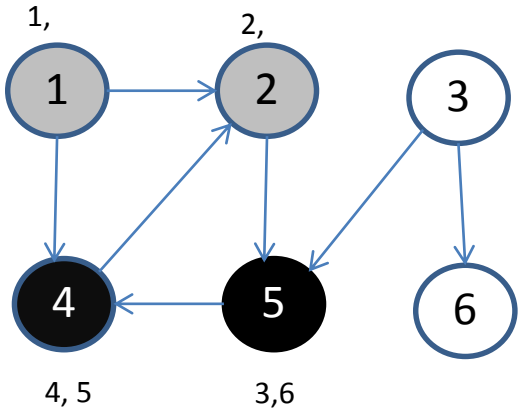
DFSVISIT(U , **4**);

T++; =6

U[5].TF = **6**;

U[5].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF= V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

DFSVISIT(Vertex_withColor[]**U**, ____**2**___) {

U[2].color = *GRAY*

T++; = 2

U[2].Td = 2;

U[2].WasVisited = true;

for (unVoisin **V5** = U[2] ## _5__ → ____→ ____ →

if (U[5].color == white?) YES

U[5].pi← 2 ;

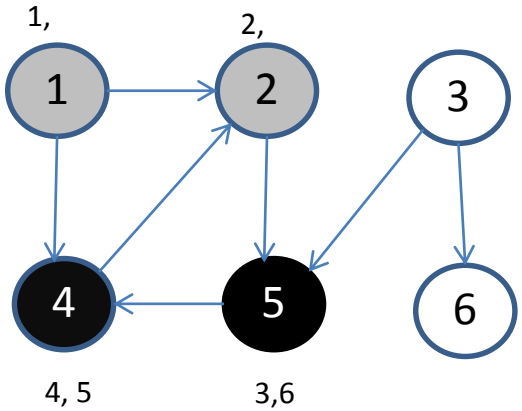
DFSVISIT(U , 5);

T++;

U[_].TF = **T**;

U[_].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF= V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

DFSVISIT(Vertex_withColor[]**U**, ____**2**___) {

U[2].color = *GRAY*

T++; = 2

U[2].Td = 2;

U[2].WasVisited = true;

for (unVoisin **V5** = U[2] ## _5__ → ____→ ____ →

if (U[5].color == white?) YES

U[5].pi← 2 ;

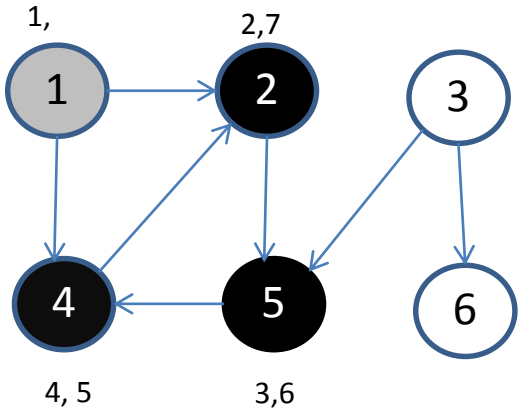
DFSVISIT(U , 5);

T++; =7

U[2].TF = **T**;

U[2].Isterminated = true;

	U	V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF=7 V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

DFSVISIT(Vertex_withColor[]**U**, ____**2**___) {

U[2].color = *GRAY*

T++; = 2

U[2].Td = 2;

U[2].WasVisited = true;

for (unVoisin **V5** = U[2] ## _5__ → _____ → _____ →

if (U[5].color == white?) YES

U[5].pi← 2 ;

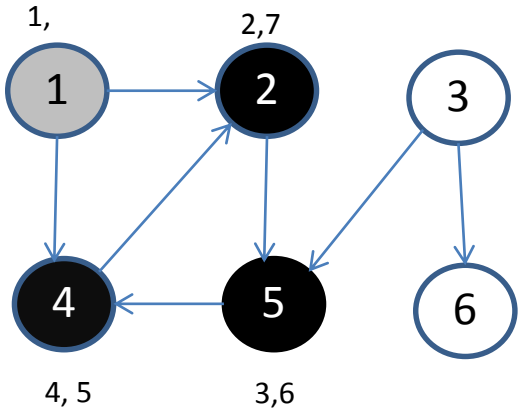
DFSVISIT(U , 5);

T++; =7

U[2].TF = **T**;

U[2].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF=7 V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

2

DFSVISIT(Vertex_withColor[]**U**, ____**2**__) {

U[2].color = *GRAY*

T++; = 2

U[2].Td = 2;

U[2].WasVisited = true;

for (unVoisin **V5** = U[2] ## _5__ → _____ → _____ →

if (U[5].color == white?) YES

U[5].pi← 2 ;

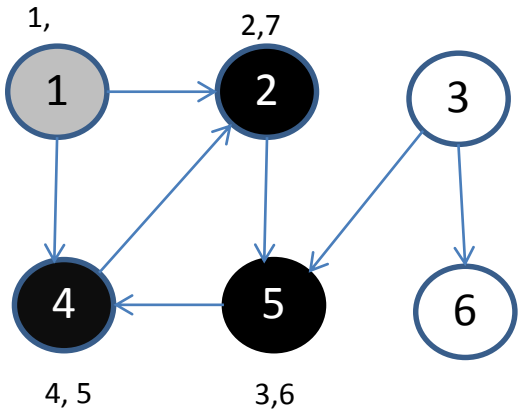
DFSVISIT(U , 5);

T++; =7

U[2].TF = **T**;

U[2].Isterminated = true;

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF= V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF=7 V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	

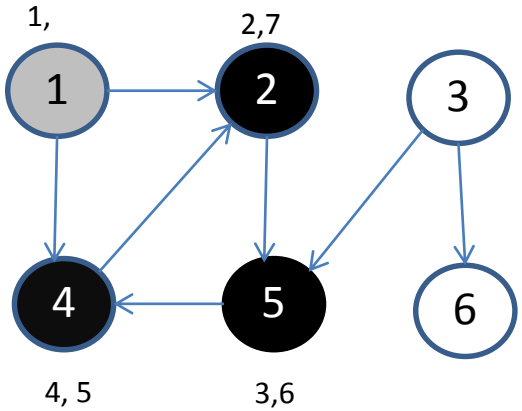


```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;
```

```
for (unVoisin V2 = U[1] ## _2__ → __4___ → _____ →
    if (  U[2].color == white?)  YES
                U[2].pi← 1 ;
                DFSVISIT( U , 2 );
        T++;
        U[_].TF = T;
        U[_].Isterminated = true;
```

U			V	V
0	Id= 0 TD=	π =99999 TF=	V ADJ ---→	
1	Id= 1 TD= 1	π =99999 TF=	V ADJ ---→	2	4
2	Id= 2 TD= 2	π = 1 TF=7	V ADJ ---→	5
3	Id= 3 TD=	π =99999 TF=	V ADJ ---→	5	6
4	Id= 4 TD= 4	π =5 TF= 5	V ADJ ---→	2
5	Id= 5 TD=3	π = 2 TF=6	V ADJ ---→	4
6	Id= 6 TD=	π =99999 TF=	V ADJ ---→	6



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

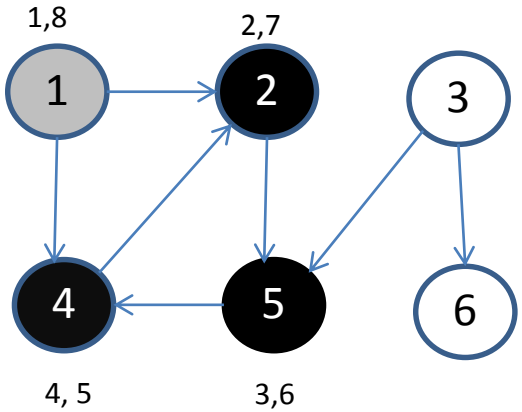
```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;
```

for (unVoisin **V2** = U[1] ## _2__ → ___4___ → _____ →

```
if (  U[2].color == white?)  YES
                U[2].pi← 1  ;
                DFSVISIT( U , 2 );
```

```
T++; 8
U[1].TF = 8;
U[1].Isterminated = true;
```

U			V	V
0	Id= 0 TD=	π =99999 TF=	V ADJ ---→		
1	Id= 1 TD= 1	π =99999 TF=8	V ADJ ---→	2	4
2	Id= 2 TD= 2	π = 1 TF=7	V ADJ ---→	5	
3	Id= 3 TD=	π =99999 TF=	V ADJ ---→	5	6
4	Id= 4 TD= 4	π =5 TF= 5	V ADJ ---→	2	
5	Id= 5 TD=3	π = 2 TF=6	V ADJ ---→	4	
6	Id= 6 TD=	π =99999 TF=	V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

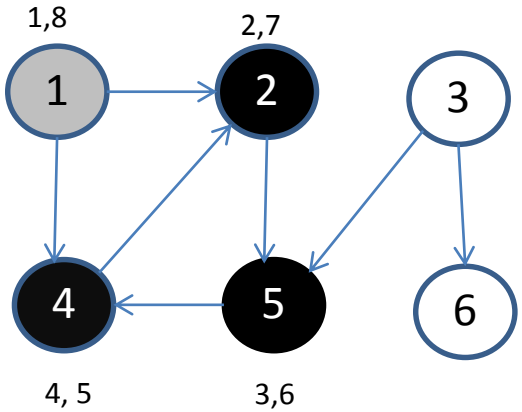
```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;
```

for (unVoisin **V2** = U[1] ## _2__ → ___4___ → _____ →

```
if (  U[2].color == white?)  YES
                        U[2].pi← 1 ;
                        DFSVISIT( U , 2 );
```

```
T++; 8
U[1].TF = 8;
U[1].Isterminated = true;
```

	U	V	V
0	Id= 0 π =99999 TD= TF= V ADJ ---→		
1	Id= 1 π =99999 TD= 1 TF=8 V ADJ ---→	2	4
2	Id= 2 π = 1 TD= 2 TF=7 V ADJ ---→	5	
3	Id= 3 π =99999 TD= TF= V ADJ ---→	5	6
4	Id= 4 π =5 TD= 4 TF= 5 V ADJ ---→	2	
5	Id= 5 π = 2 TD=3 TF=6 V ADJ ---→	4	
6	Id= 6 π =99999 TD= TF= V ADJ ---→	6	



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
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for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```
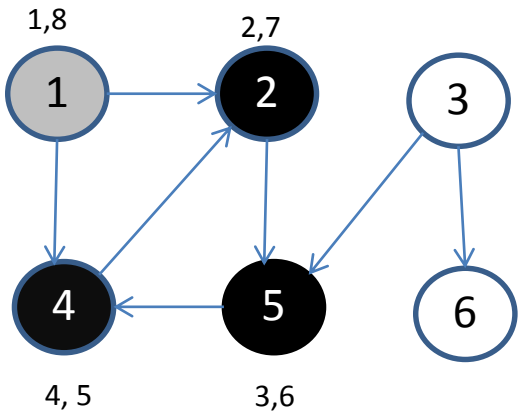

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;

for (unVoisin V4 = U[1] ## ___ → ___4___ → ____ →
   if (  U[4].color == white?)  NO
                U[4].pi← 1 ;
                DFSVISIT( U , 4 );
        T++; 8
        U[1].TF = 8;
        U[1].Isterminated = true;
```

	U	V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF=8 V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF=7 V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	

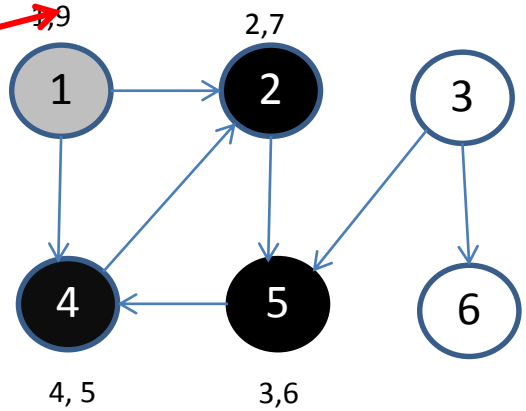


```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
 T= 0;
for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

U		V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF=8 V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF=7 V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6	

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;
```

```
for (unVoisin V4 = U[1] ## ___ → __4__ → ____ →
    if (  U[4].color == white?) NO
                U[4].pi← 1 ;
                DFSVISIT( U , 4 );
            T++; 9
            U[1].TF = 8;
            U[1].Isterminated = true;
```



```
public static void DFS(Vertex_withColor[] U){
int sizeU = 7;
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for (int cnt = 1; cnt < sizeU; cnt++){
        if (  U[1].color == 1) {
                DFSVISIT(U, 1); };   }
```

```
DFSVISIT(Vertex_withColor[]U, ____1___) {
 U[1].color = GRAY
  T++; = 1
 U[1].Td = 1;
 U[1].WasVisited = true;
```

for (unVoisin **V4** = U[ ] ## ___ → ___**4**___ → ____ →

```
if (  U[4].color == white?)  NO
                U[4].pi← 1 ;
                DFSVISIT( U , 4 );
```

```
T++; 9
U[1].TF = 8;
U[1].Isterminated = true;
```

LLOOOK AT THE FUCKING DOR LOOP

	U	V	V
0	Id= 0 TD= π =99999 TF= V ADJ ---→		
1	Id= 1 TD= 1 π =99999 TF=8 V ADJ ---→	2	4
2	Id= 2 TD= 2 π = 1 TF=7 V ADJ ---→	5	
3	Id= 3 TD= π =99999 TF= V ADJ ---→	5	6
4	Id= 4 TD= 4 π =5 TF= 5 V ADJ ---→	2	
5	Id= 5 TD=3 π = 2 TF=6 V ADJ ---→	4	
6	Id= 6 TD= π =99999 TF= V ADJ ---→	6