# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
      cout<<curr->data<<" ";
      curr=curr->right;
    }
    else
    {
        /* finding inorder predecessor */
    Node* predecessor=find_inorder_predecessor(curr);

      /* Make curr as the right child of its inorder predecessor */
      if(predecessor->right==NULL)
      {
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int main()
{
  Node* root = new_node(1);
  root->left = new_node(2);
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  cout<<"\nMorris Inorder Traversal of the graph: ";
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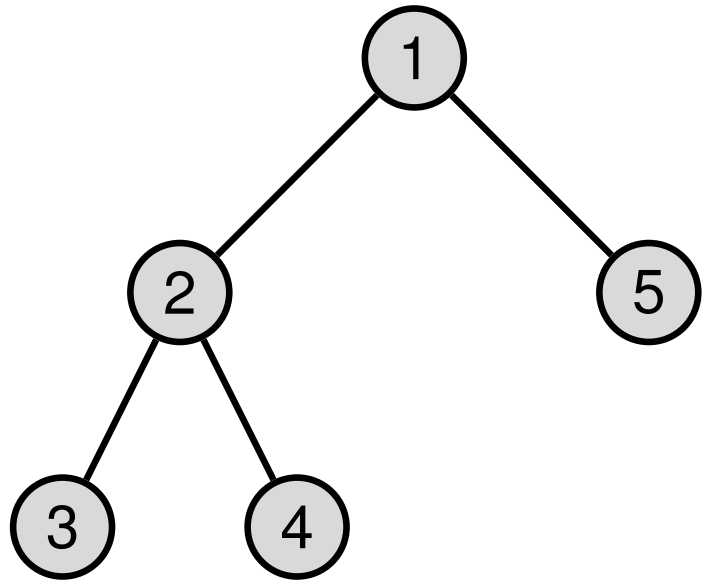

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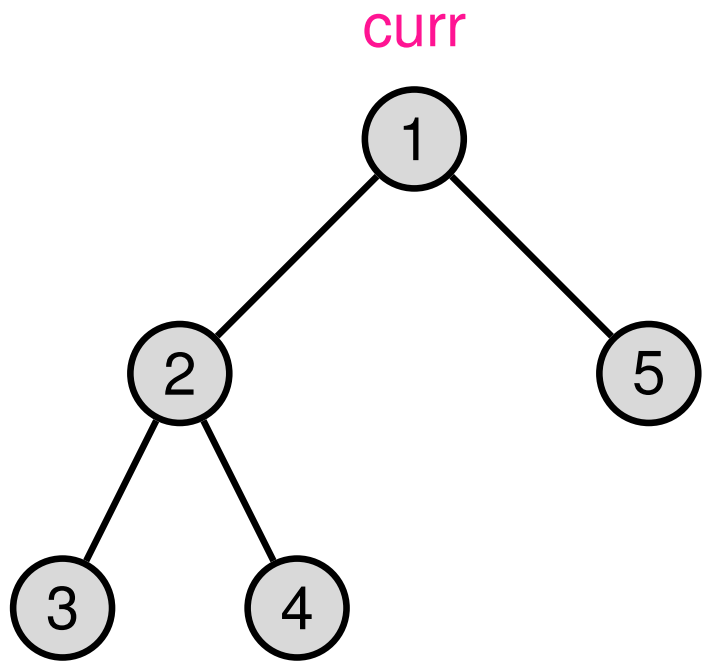


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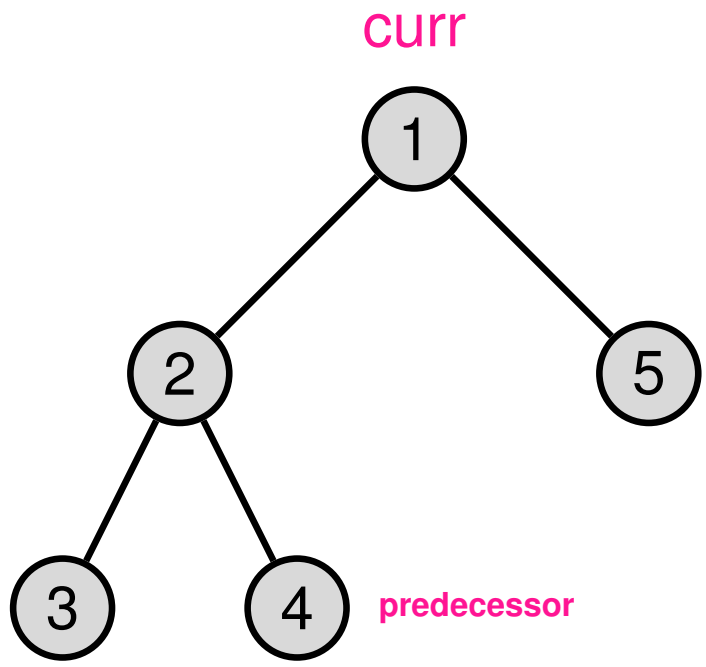


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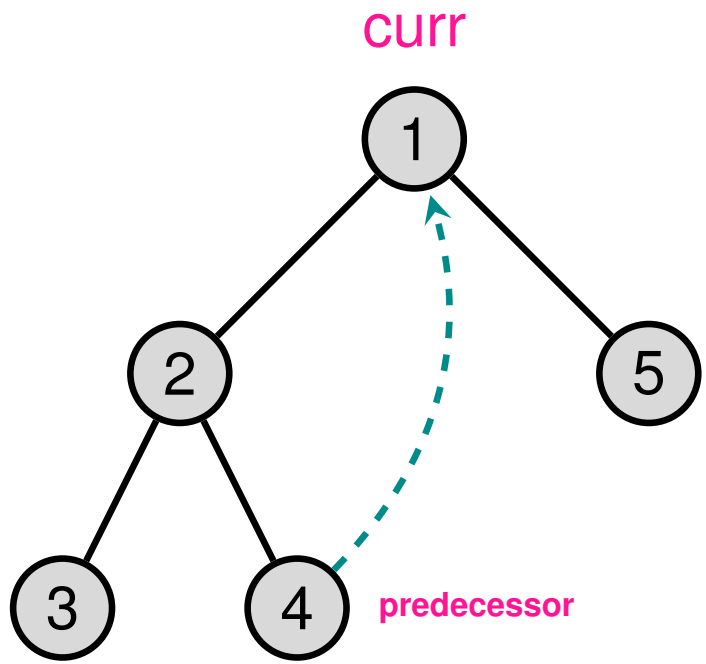


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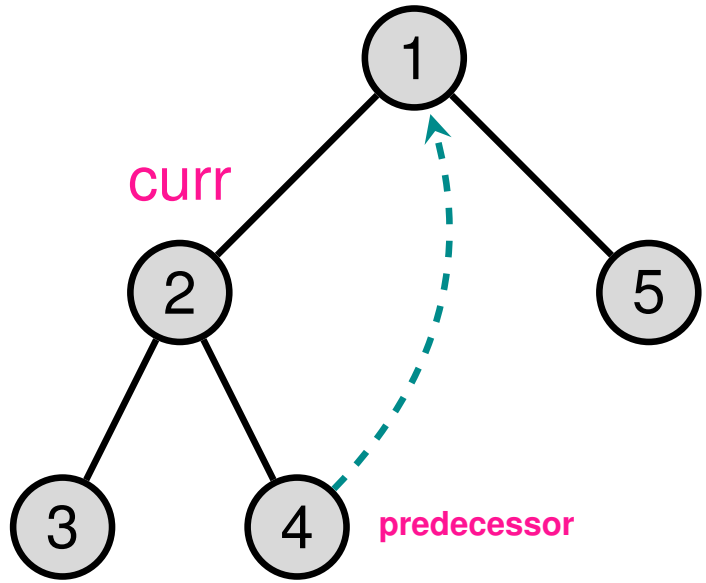


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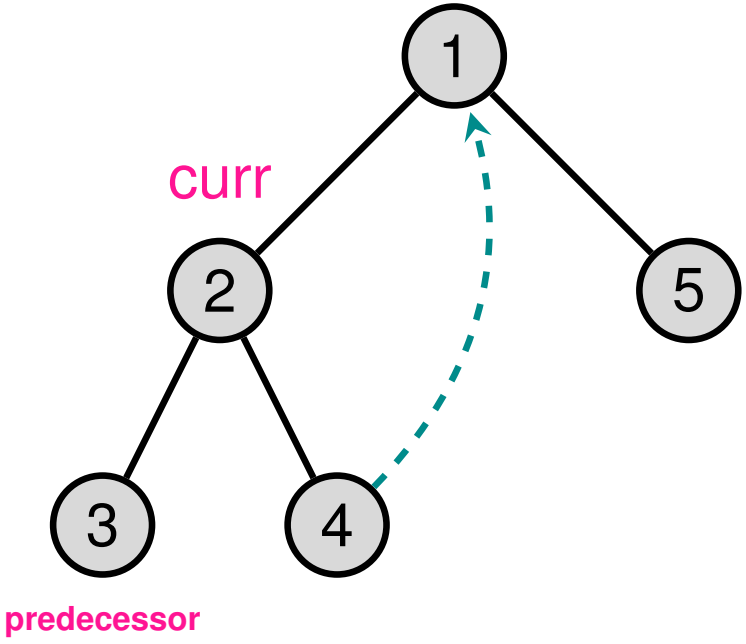


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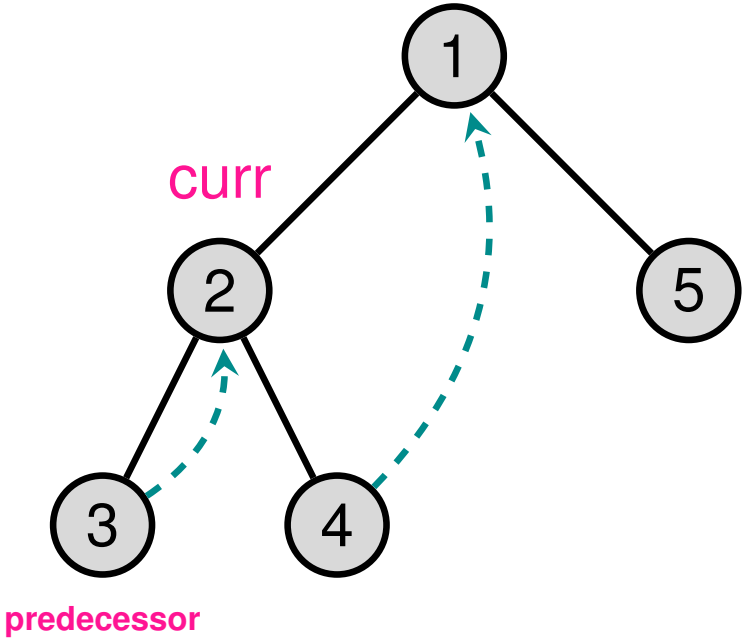


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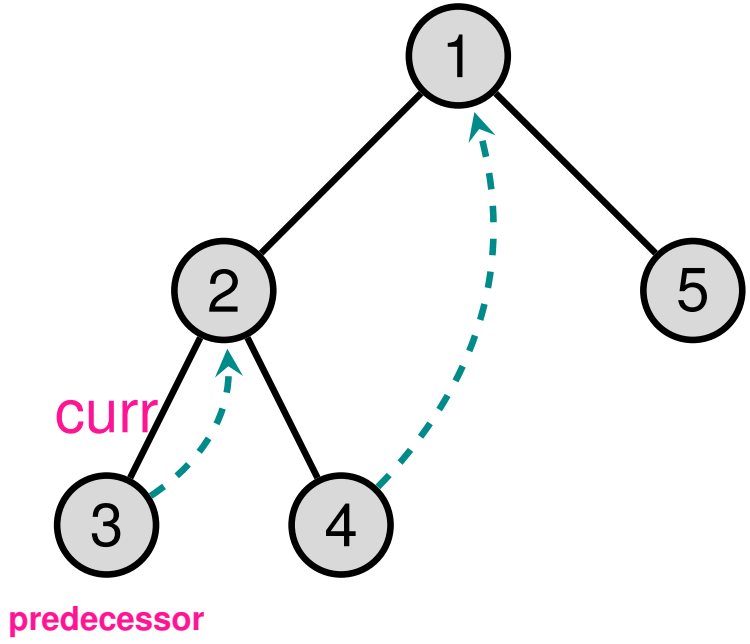


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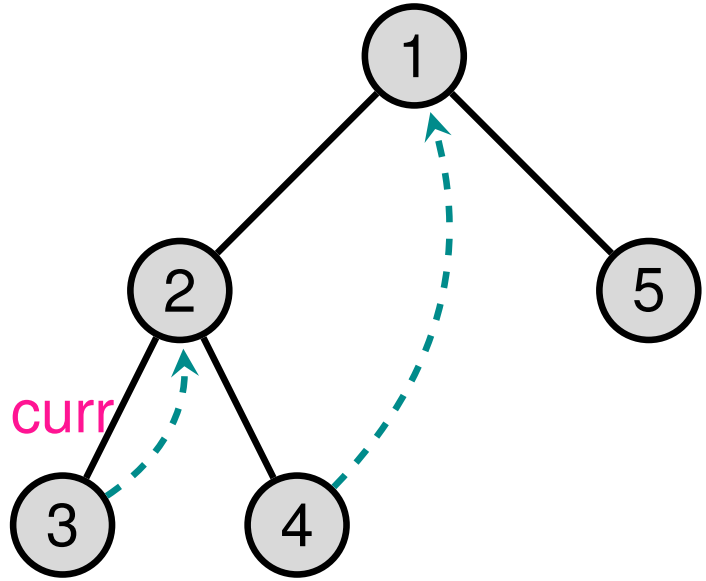


**Output: 3**

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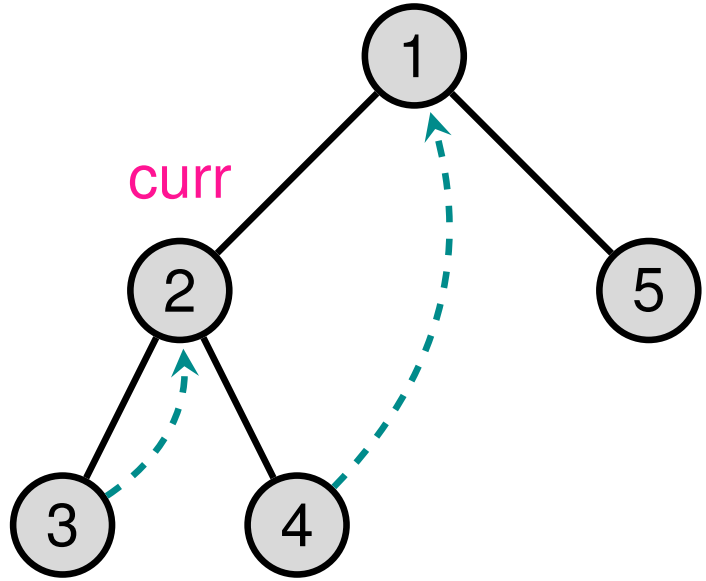


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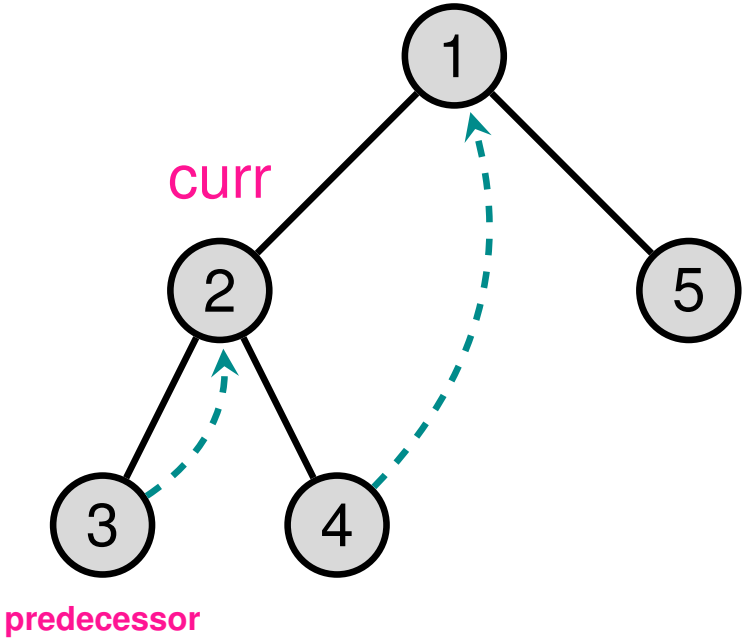


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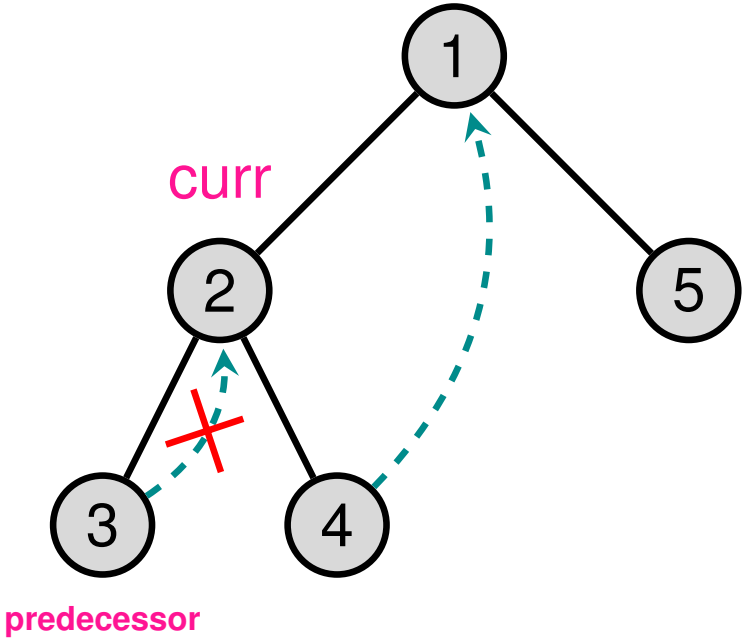


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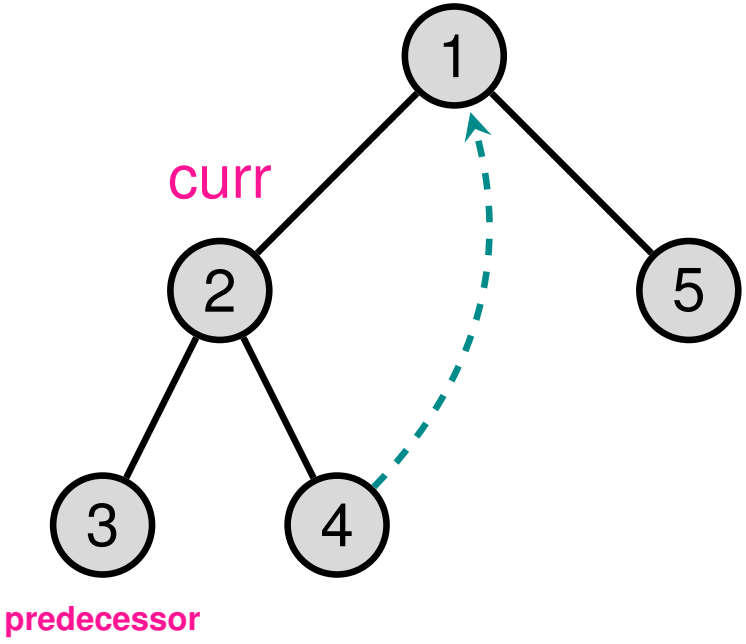


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  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

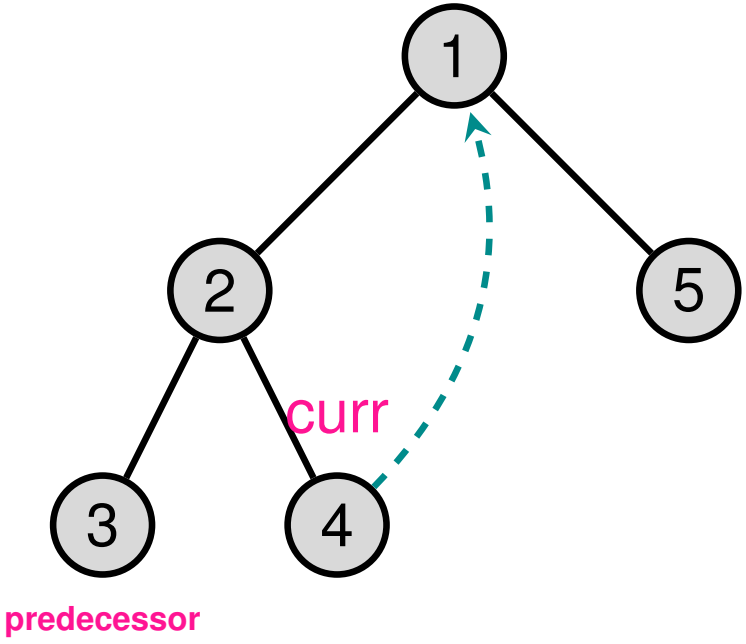
/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
      cout<<curr->data<<" ";
      curr=curr->right;
    }
    else
    {
        /* finding inorder predecessor */
    Node* predecessor=find_inorder_predecessor(curr);

      /* Make curr as the right child of its inorder predecessor */
      if(predecessor->right==NULL)
      {
        predecessor->right=curr;
        curr=curr->left;
      }
      else
      {
        predecessor->right=NULL;
        cout<<curr->data<<" ";
        curr=curr->right;
      }
    }
  }
}

int main()
{
  Node* root = new_node(1);
  root->left = new_node(2);
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

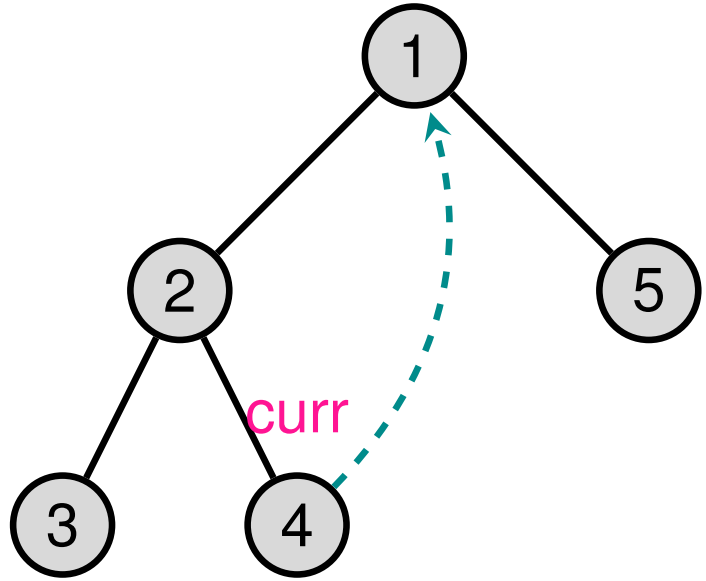
/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
     cout<<curr->data<<" ";
      curr=curr->right;
    }
    else
    {
        /* finding inorder predecessor */
    Node* predecessor=find_inorder_predecessor(curr);

      /* Make curr as the right child of its inorder predecessor */
      if(predecessor->right==NULL)
      {
        predecessor->right=curr;
        curr=curr->left;
      }
      else
      {
        predecessor->right=NULL;
        cout<<curr->data<<" ";
        curr=curr->right;
      }
    }
  }
}

int main()
{
  Node* root = new_node(1);
  root->left = new_node(2);
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

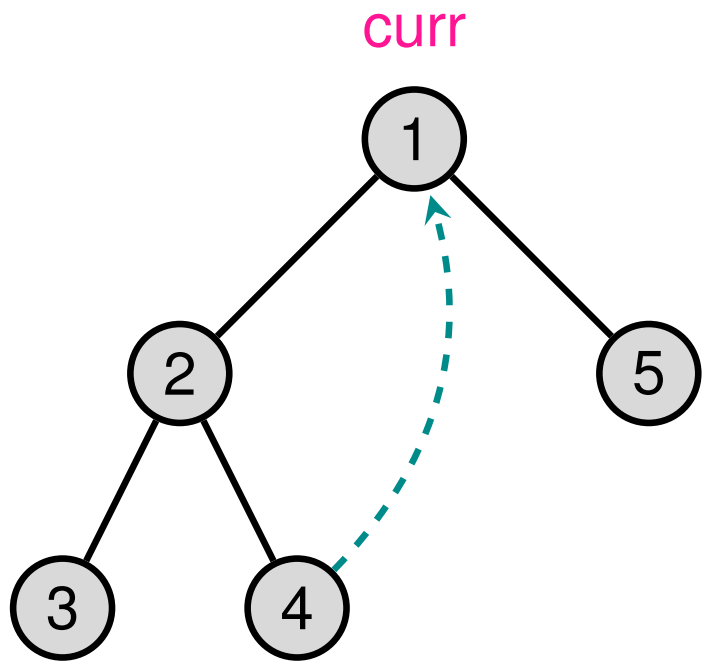
/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
      cout<<curr->data<<" ";
      curr=curr->right;
    }
    else
    {
        /* finding inorder predecessor */
    Node* predecessor=find_inorder_predecessor(curr);

      /* Make curr as the right child of its inorder predecessor */
      if(predecessor->right==NULL)
      {
        predecessor->right=curr;
        curr=curr->left;
      }
      else
      {
        predecessor->right=NULL;
        cout<<curr->data<<" ";
        curr=curr->right;
      }
    }
  }
}

int main()
{
  Node* root = new_node(1);
  root->left = new_node(2);
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
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      curr=curr->right;
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        curr=curr->left;
      }
      else
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int main()
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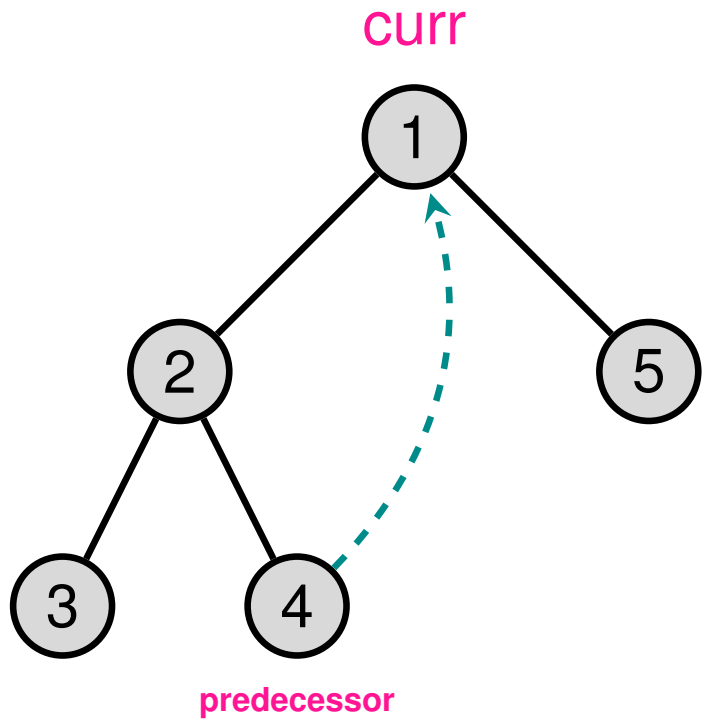
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
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      curr=curr->right;
    }
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      /* Make curr as the right child of its inorder predecessor */
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      {
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        curr=curr->left;
      }
      else
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}

int main()
{
  Node* root = new_node(1);
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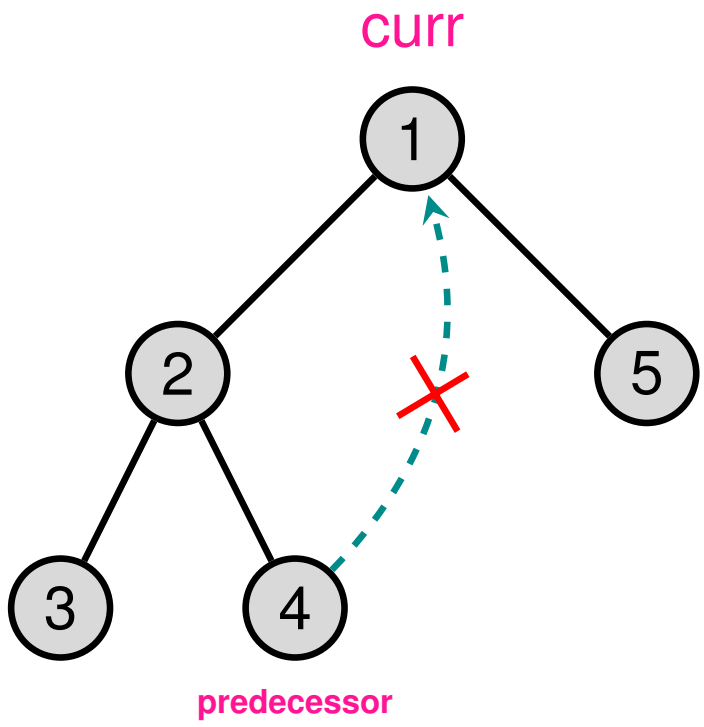
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
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      /* Make curr as the right child of its inorder predecessor */
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        curr=curr->left;
      }
      else
      {
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        curr=curr->right;
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int main()
{
  Node* root = new_node(1);
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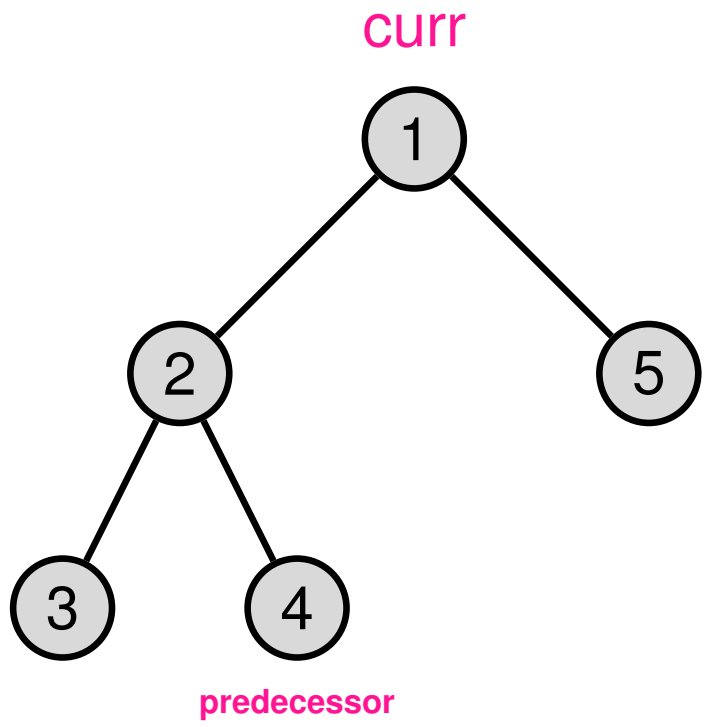
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4 1**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
      cout<<curr->data<<" ";
      curr=curr->right;
    }
    else
    {
        /* finding inorder predecessor */
    Node* predecessor=find_inorder_predecessor(curr);

      /* Make curr as the right child of its inorder predecessor */
      if(predecessor->right==NULL)
      {
        predecessor->right=curr;
        curr=curr->left;
      }
      else
      {
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        cout<<curr->data<<" ";
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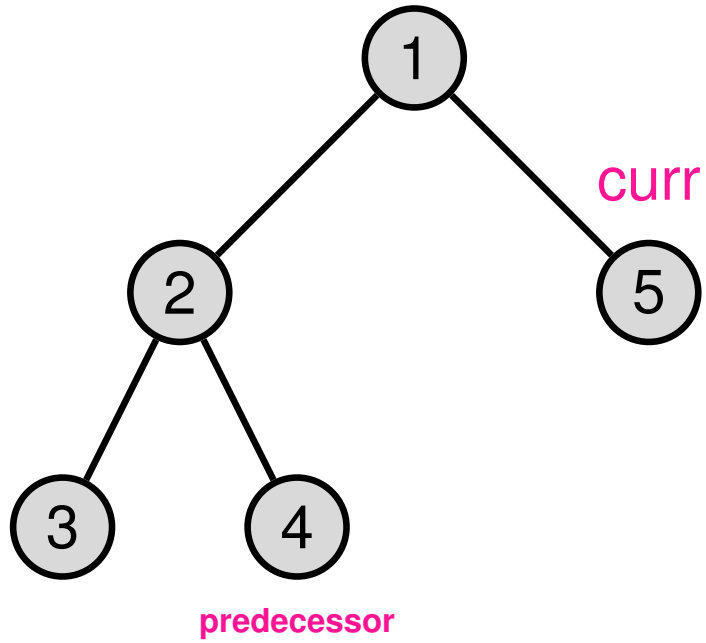
    }
  }
}

int main()
{
  Node* root = new_node(1);
  root->left = new_node(2);
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4 1**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
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      /* Make curr as the right child of its inorder predecessor */
      if(predecessor->right==NULL)
      {
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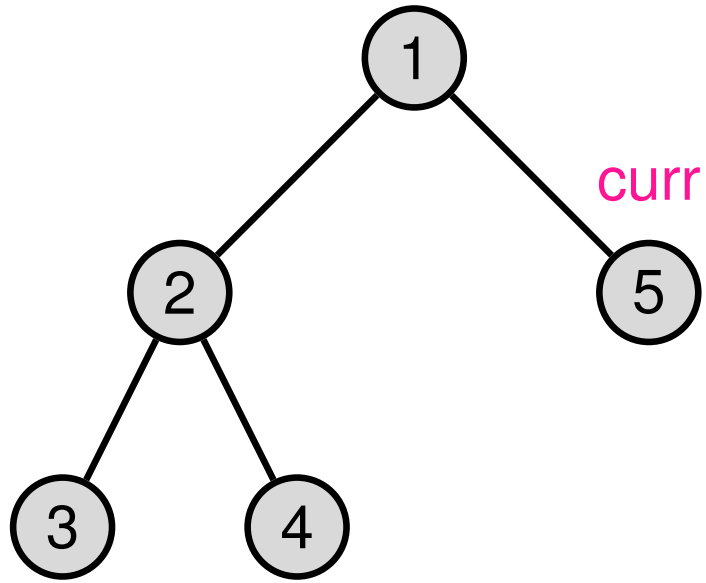
        curr=curr->left;
      }
      else
      {
        predecessor->right=NULL;
        cout<<curr->data<<" ";
        curr=curr->right;
      }
    }
  }
}

int main()
{
  Node* root = new_node(1);
  root->left = new_node(2);
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4 1 5**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

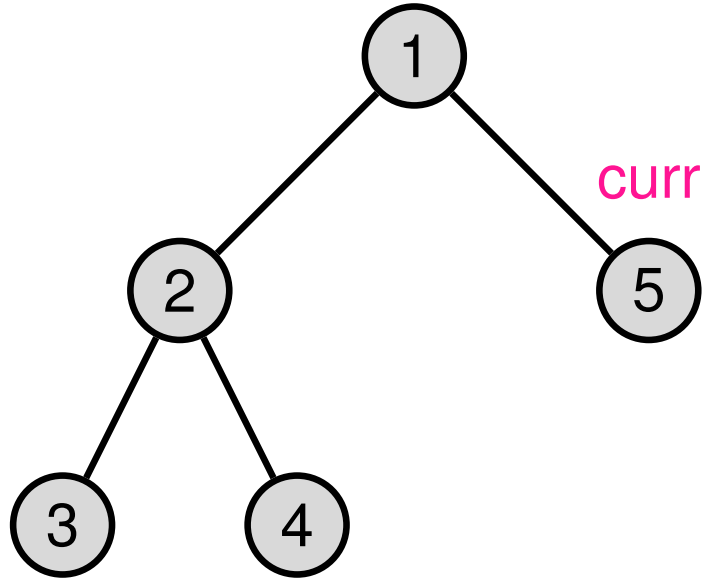
/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
{
  Node *curr;
  curr = root;

  while (curr!=NULL)
  {
    /* if curr doesn't have left child */
    if (curr->left==NULL)
    {
      cout<<curr->data<<" ";
      curr=curr->right;
    }
    else
    {
        /* finding inorder predecessor */
    Node* predecessor=find_inorder_predecessor(curr);

      /* Make curr as the right child of its inorder predecessor */
      if(predecessor->right==NULL)
      {
        predecessor->right=curr;
        curr=curr->left;
      }
      else
      {
        predecessor->right=NULL;
        cout<<curr->data<<" ";
        curr=curr->right;
      }
    }
  }
}

int main()
{
  Node* root = new_node(1);
  root->left = new_node(2);
  root->right = new_node(5);
  root->left->left = new_node(3);
  root->left->right = new_node(4);
 /* this input tree is shown in above figure */
  cout<<"\nMorris Inorder Traversal of the graph: ";
  morris_inorder_traversal(root);

  return 0;
}
```




**Output: 3 2 4 1 5**

# Morris Inorder Tree Traversal

```
/* Find predecessor */
Node* find_inorder_predecessor(Node* curr)
{
  Node* predecessor=curr->left;
  while (predecessor->right != NULL && predecessor->right != curr)
    predecessor=predecessor->right;

    return predecessor;
}

/* Morris Inorder traversal */
void morris_inorder_traversal(Node* root)
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      {
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        curr=curr->left;
      }
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      {
        predecessor->right=NULL;
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int main()
{
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  return 0;
}
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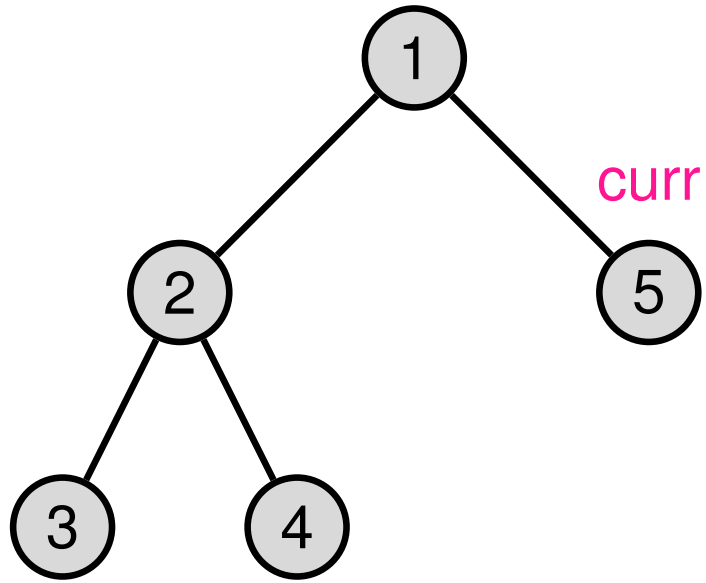


**Output: 3 2 4 1 5**