



NUMBER :	NAME :	EXAM GRADE	
		[.....]
SIGNATURE :			
Students have to obey Engineering Faculty Exam Execution Instructions .			
Brief information about the exam will be given at the beginning, then no one is allowed to ask a question during the exam.			

```

void traverse1(Node* v)
{
  if (v->left != NULL)    traverse1(v->left);
  else                    cout << v->elt << " ";
  if (v->right != NULL)   traverse1(v->right);
}

void traverse2(Node* v)
{
  if (v->left != NULL)    traverse2(v->left);
  if (v->right != NULL)   traverse2(v->right);
  else                    cout << v->elt << " ";
}

void traverse3(Node* v)
{
  if (v->left == NULL)    cout << v->elt << " ";
  else                    traverse3(v->left);
  if (v->right != NULL)   traverse3(v->right);
}

void traverse4(Node* v)
{
  if (v->left != NULL)    traverse4(v->left);
  if (v->right == NULL)   cout << v->elt << " ";
  else                    traverse4(v->right);
}

```

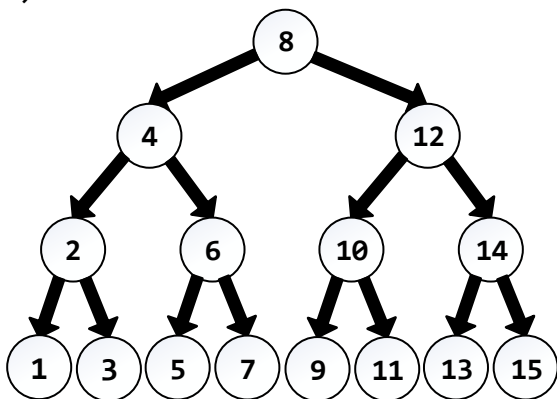
```

void traverse(Node* v)
{
  stack<Node*> stl_stack;
  Node* current = v;

  while (true)
  {
    if (current != NULL)
    {
      stl_stack.push(current);
      current = current->left;
    }
    else
    {
      if (stl_stack.empty())
      {
        return;
      }
      else
      {
        current = stl_stack.top();
        cout << current->elt << " ";
        stl_stack.pop();
        current = current->right;
      }
    }
  }
}

```

1. What is the outputs of the functions above that are called in the **main()** with the **root** of the tree below? (20P)



traverse1:

traverse2:

traverse3:

traverse4:

2. What is the output of the function **traverse()** that is called in the **main()** with the **root** of the tree on the left? (30P)

