Code

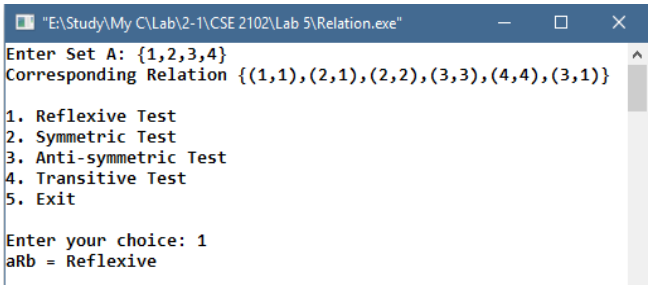
```
#include<bits/stdc++.h>
using namespace std;

void CheckReflexive(char *s1,char *s2)
{
   int c=0,j=0;
   for(int i=0;i<strlen(s2);i=i+2)
      if(s2[i]==s1[j])
         if(s2[i+1]==s1[j])
         {
            c++;
            j++;
            continue;
         }
   if(j==strlen(s1))
      cout<<"aRb = Reflexive"<<endl;
   else
      cout<<"aRb = Not Reflexive"<<endl;
}

void CheckSymmetric(char *s2)
{
   char temp_a,temp_b;
   int j=0,i,k,flag=0,ASFlagCount=0;
   for(i=0;i<strlen(s2);i=i+2)
   {
      flag = 0;
      temp_a = s2[j];
      temp_b = s2[j+1];
      j=j+2;
      for(k=0;k<strlen(s2)&&temp_a!=temp_b;k=k+2)
         if(s2[k]==temp_b)
            if(s2[k+1]==temp_a)
               flag = 1;
      if(flag == 0 && (temp_a != temp_b))
         ASFlagCount++;
   }
   if(ASFlagCount != 0) {
      cout<<"aRb = Not Symmetric"<<endl;
      return;
   }
   if(flag == 1)
      cout<<"aRb = Symmetric"<<endl;
}
```

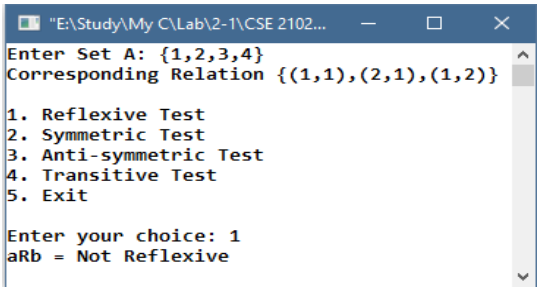
```
void CheckAntiSymmetric(char *s2)
{
   char temp_a,temp_b;
   int j=0,i,k,flag=0;
   for(i=0;i<strlen(s2);i=i+2)
   {
      temp_a = s2[j];
      temp_b = s2[j+1];
      j=j+2;
      for(k=0;k<strlen(s2)&&temp_a!=temp_b;k=k+2)
         if(s2[k]==temp_b)
            if(s2[k+1]==temp_a)
               flag = 1;
   }
   if(flag != 1)
      cout<<"aRb = Anti-symmetric"<<endl;
   else
      cout<<"aRb = Not Anti-symmetric"<<endl;
}

bool pair_exist(char left, char right, char *s2, int len2)
{
  for (int i=0; i<len2; i+=2)
  {
    if (left==s2[i] && right==s2[i+1])  return true;
  }
  return false;
}

bool transitive(char *s2, int len1)
{
  for (int i=0; i<len1; i+=2)
  {
    char e = s2[i];
    char f = s2[i+1];
    for (int j=0; j<len1; j+=2)
    {
      if (i == j)
        continue;
      if (s2[j] != f)
        continue;
      if (!pair_exist(e, s2[j+1], s2, len1))
        return false;
    }
  }
}
```

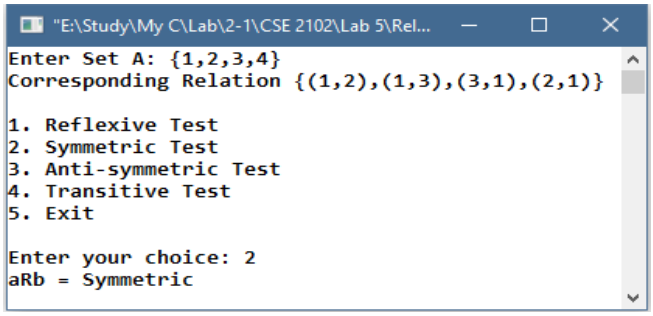
```
void CheckTransitive(char *s2,int l)
{
   if((transitive(s2,l))==true)
      cout<<"aRb = Transitive"<<endl;
   else
      cout<<"aRb = Not Transitive"<<endl;
}

void menu(char *s1, char *s2)
{
   int choice,flag=0;
   int len = strlen(s2);
   cout<<"\n1. Reflexive Test\n2. Symmetric Test\n3. Anti-symmetric Test\n4. Transitive
Test\n5. Exit"<<endl;
   while(flag == 0)
   {
      cout<<"\nEnter your choice: ";
      cin>>choice;
      switch(choice)
      {
         case 1:
            CheckReflexive(s1,s2);
            break;
         case 2:
            CheckSymmetric(s2);
            break;
         case 3:
            CheckAntiSymmetric(s2);
            break;
         case 4:
            CheckTransitive(s2,len);
            break;
         case 5:
            cout<<"Program Finished. . . "<<endl;
            flag = 1;
            break;
      }
   }
}

int main()
{
   int ActLen1,ActLen2,c=0,d=0;
   char set1[50],set2[60];
   char str1[20],str2[20];
```

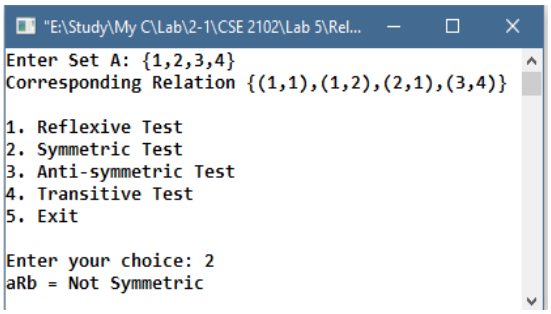
```
    cout<<"Enter Set A: ";
    gets(set1);
    cout<<"Corresponding Relation ";
    gets(set2);

    ActLen1=((strlen(set1)-2)/2)+1;
    ActLen2=((strlen(set2)-2)/5)*2;

    for(int i=0,j=0;i<strlen(set1);i++)
    {
       if(j==ActLen1){
          str1[j]='\0';
          break;
       }
       else if(set1[i]!='{' && set1[i]!='}' && set1[i]!=','){
          str1[j]=set1[i];
          j++;
       }
    }

    for(int i=0,j=0;i<strlen(set2);i++)
    {
       if(j==ActLen2){
          str2[j]='\0';
          break;
       }
       else if(set2[i]!='{' && set2[i]!='}' && set2[i]!=',' && set2[i]!='(' && set2[i]!=')'){
          str2[j]=set2[i];
          j++;
       }
    }

    menu(str1,str2);

    return 0;
}
```

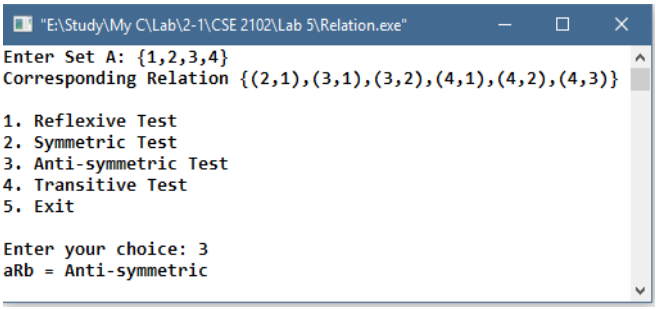
Output

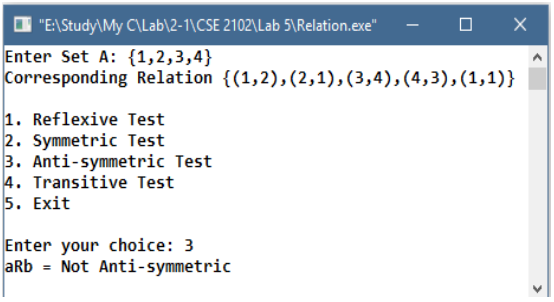

"E:\Study\My C\Lab\2-1\CSE 2102\Lab 5\Relation.exe"
Enter Set A: {1,2,3,4}
Corresponding Relation {(1,1),(2,1),(2,2),(3,3),(4,4),(3,1)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 1
aRb = Reflexive

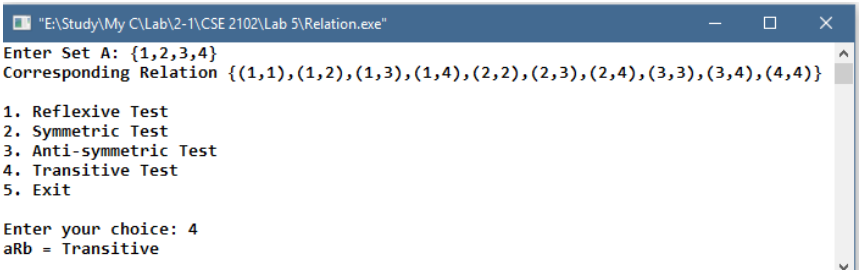

"E:\Study\My C\Lab\2-1\CSE 2102...
Enter Set A: {1,2,3,4}
Corresponding Relation {(1,1),(2,1),(1,2)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 1
aRb = Not Reflexive

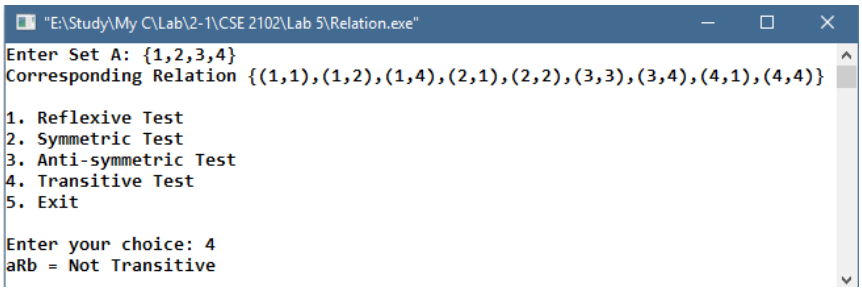

"E:\Study\My C\Lab\2-1\CSE 2102\Lab 5\Rel...
Enter Set A: {1,2,3,4}
Corresponding Relation {(1,2),(1,3),(3,1),(2,1)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 2
aRb = Symmetric


"E:\Study\My C\Lab\2-1\CSE 2102\Lab 5\Rel...
Enter Set A: {1,2,3,4}
Corresponding Relation {(1,1),(1,2),(2,1),(3,4)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 2
aRb = Not Symmetric


"E:\Study\My C\Lab\2-1\CSE 2102\Lab 5\Relation.exe"
Enter Set A: {1,2,3,4}
Corresponding Relation {(2,1),(3,1),(3,2),(4,1),(4,2),(4,3)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 3
aRb = Anti-symmetric


"E:\Study\My C\Lab\2-1\CSE 2102\Lab 5\Relation.exe"
Enter Set A: {1,2,3,4}
Corresponding Relation {(1,2),(2,1),(3,4),(4,3),(1,1)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 3
aRb = Not Anti-symmetric


"E:\Study\My C\Lab\2-1\CSE 2102\Lab 5\Relation.exe"
Enter Set A: {1,2,3,4}
Corresponding Relation {(1,1),(1,2),(1,3),(1,4),(2,2),(2,3),(2,4),(3,3),(3,4),(4,4)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 4
aRb = Transitive


"E:\Study\My C\Lab\2-1\CSE 2102\Lab 5\Relation.exe"
Enter Set A: {1,2,3,4}
Corresponding Relation {(1,1),(1,2),(1,4),(2,1),(2,2),(3,3),(3,4),(4,1),(4,4)}
1. Reflexive Test
2. Symmetric Test
3. Anti-symmetric Test
4. Transitive Test
5. Exit
Enter your choice: 4
aRb = Not Transitive