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B.Tech. IT, Sem: VII

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Experiment 2: Write a C/C++/Java program to implement Play Fair cipher

1. Code

```
#include <iostream>
#include <string>
using namespace std;
class playfair
{
public:
   void doIt( string k, string t, bool ij, bool e )
   {
         createGrid( k, ij ); getTextReady( t, ij, e );
         if( e ) doIt( 1 ); else doIt( -1 );
         display();
   }
private:
   void doIt( int dir )
   {
         int a, b, c, d; string ntxt;
         for( string::const_iterator ti = _txt.begin(); ti != _txt.end(); ti++ )
         {
            if( getCharPos( *ti++, a, b ) )
                  if( getCharPos( *ti, c, d ) )
```

```
                {
                   if( a == c )     { ntxt += getChar( a, b + dir ); ntxt += getChar( c, d + dir ); }
                   else if( b == d ){ ntxt += getChar( a + dir, b ); ntxt += getChar( c + dir, d ); }
                   else             { ntxt += getChar( c, b ); ntxt += getChar( a, d ); }
                }
        }
        _txt = ntxt;
}
void display()
{
        cout << "\n\n OUTPUT:\n=========" << endl;
        string::iterator si = _txt.begin(); int cnt = 0;
        while( si != _txt.end() )
        {
           cout << *si; si++; cout << *si << " "; si++;
           if( ++cnt >= 26 ) cout << endl, cnt = 0;
        }
        cout << endl << endl;
}
char getChar( int a, int b )
{
        return _m[ (b + 5) % 5 ][ (a + 5) % 5 ];
}
bool getCharPos( char l, int &a, int &b )
{
        for( int y = 0; y < 5; y++ )
           for( int x = 0; x < 5; x++ )
                if( _m[y][x] == l )
                { a = x; b = y; return true; }
```

```
        return false;
}
void getTextReady( string t, bool ij, bool e )
{
        for( string::iterator si = t.begin(); si != t.end(); si++ )
        {
           *si = toupper( *si ); if( *si < 65 || *si > 90 ) continue;
           if( *si == 'J' && ij ) *si = 'I';
           else if( *si == 'Q' && !ij ) continue;
           _txt += *si;
        }
        if( e )
        {
           string ntxt = ""; size_t len = _txt.length();
           for( size_t x = 0; x < len; x += 2 )
           {
                 ntxt += _txt[x];
                 if( x + 1 < len )
                 {
                    if( _txt[x] == _txt[x + 1] ) ntxt += 'X';
                    ntxt += _txt[x + 1];
                 }
           }
           _txt = ntxt;
        }
        if( _txt.length() & 1 ) _txt += 'X';
}
void createGrid( string k, bool ij )
{
```

```
        if( k.length() < 1 ) k = "KEYWORD";
        k += "ABCDEFGHIJKLMNOPQRSTUVWXYZ"; string nk = "";
        for( string::iterator si = k.begin(); si != k.end(); si++ )
        {
           *si = toupper( *si ); if( *si < 65 || *si > 90 ) continue;
           if( ( *si == 'J' && ij ) || ( *si == 'Q' && !ij ) )continue;
           if( nk.find( *si ) == -1 ) nk += *si;
        }
        copy( nk.begin(), nk.end(), &_m[0][0] );
   }
   string _txt; char _m[5][5];
};
int main( int argc, char* argv[] )
{
   string key, i, txt; bool ij, e;
   cout << "(E)ncode or (D)ecode? "; getline( cin, i ); e = ( i[0] == 'e' || i[0] == 'E' );
   cout << "Enter a en/decryption key: "; getline( cin, key );
   cout << "I <-> J (Y/N): "; getline( cin, i ); ij = ( i[0] == 'y' || i[0] == 'Y' );
   cout << "Enter the text: "; getline( cin, txt );
   playfair pf; pf.doIt( key, txt, ij, e ); return system( "pause" );
}
```

2. Output

```
dmx@dmx ~/Sem 7 new/Sem-7/ECES/Playfair  ‹master*›
➜  g++ descpt.cpp
dmx@dmx ~/Sem 7 new/Sem-7/ECES/Playfair  ‹master*›
➜  ./a.out
(E)ncode or (D)ecode? e
Enter a en/decryption key: 6
I <-> J (Y/N): y
Enter the text: dishant


 OUTPUT:
=========
IO XN CL SY

sh: 1: pause: not found
dmx@dmx ~/Sem 7 new/Sem-7/ECES/Playfair  ‹master*›
➜  ./a.out
(E)ncode or (D)ecode? d
Enter a en/decryption key: 6
I <-> J (Y/N): y
Enter the text: IOXNCLSY


 OUTPUT:
=========
DI SH AN TX

sh: 1: pause: not found
dmx@dmx ~/Sem 7 new/Sem-7/ECES/Playfair  ‹master*›
➜
```