**LISTING PROGRAM**

**Kode Program Form Main:**

```vbnet
#Region  Project Attributes
    #ApplicationLabel: Samuel Panjaitan
    #VersionCode: 1
    #VersionName:
    #SupportedOrientations: portrait
    #CanInstallToExternalStorage: False
#End Region

#Region  Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
#End Region

Sub Process_Globals
    Dim timer1 As Timer
End Sub

Sub Global
    Dim num As Int
    Private pbLoading As ProgressBar
End Sub

Sub Activity_Create(FirstTime As Boolean)
    timer1.Initialize("timer1", 100)
    timer1.Enabled=True
End Sub

Sub timer1_tick
    num = num + 1
    pbLoading.Progress = num
    If (num>=100) Then
        timer1.Enabled=False
        pbLoading.Visible=False
        StartActivity("Home")
        Activity.Finish
    End If
End Sub

Sub Activity_Pause (UserClosed As Boolean)
End Sub
```
Kode Program Form Home:

```vbnet
#Region Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
#End Region

Sub Process_Globals
End Sub

Sub Globals
    Private btnEncryption As Button
    Private btnDecryption As Button
End Sub

Sub Activity_Create(FirstTime As Boolean)
    Activity.LoadLayout("home")
    Activity.Title = "Home"
    Activity.AddMenuItem("Setting", "Setting")
    Activity.AddMenuItem("About", "About")
    Activity.AddMenuItem("Exit", "Exit")
    Setting.keyCTC = "HACK"
    Setting.keyDES = "KOMPUTER"
End Sub

Sub Activity_Resume
End Sub

Sub Activity_Pause (UserClosed As Boolean)
End Sub

Sub btnEncryption_Click
    StartActivity("Encryption")
    Activity.Finish
End Sub

Sub btnDecryption_Click
    StartActivity("Decryption")
    Activity.Finish
End Sub

Sub setting_click
    StartActivity("Setting")
    Activity.Finish
End Sub

Sub about_click
    StartActivity("About")
    Activity.Finish
End Sub

Sub exit_click
    ExitApplication
    Activity.Finish
End Sub
```

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Kode Program Form Setting:

```vba
#Region Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
#End Region

Sub Process_Globals
    Dim keyDES As String
    Dim keyCTC As String
End Sub

Sub Globals
    Private btnSimpan As Button
    Public txtKeyDES As EditText
    Public txtKeyCTC As EditText
End Sub

Sub Activity_Create(FirstTime As Boolean)
    Activity.LoadLayout("setting")
    Activity.Title = "Setting"
    Activity.AddMenuItem("Home", "Home")
End Sub

Sub Activity_Resume
End Sub

Sub Activity_Pause (UserClosed As Boolean)
End Sub

Sub btnSimpan_Click
    If txtKeyDES.Text.Length = 8 Then
        keyDES = txtKeyDES.Text.Trim
        keyCTC = txtKeyCTC.Text.Trim
        ToastMessageShow("Berhasil mengubah kunci enkripsi data",True)
    Else
        MsgBox("Kunci DES harus tepat 8 karakter!","Kesalahan")
    End If
End Sub

Sub home_click
    StartActivity("Home")
End Sub
```
Kode Program Form About:

```vbscript
#Region  Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
#End Region

Sub Process_Globals
    End Sub

Sub Globals
    Private lblFooter As Label
End Sub

Sub Activity_Create(FirstTime As Boolean)
    Activity.LoadLayout("about")
    Activity.Title = "About"
    Activity.AddMenuItem("Home", "Home")
    lblFooter.Text = "A person who never made a mistake, never tried anything new - Albert Einstein"
End Sub

Sub Activity_Resume
End Sub

Sub Activity_Pause (UserClosed As Boolean)
End Sub

Sub home_click
    StartActivity("Home")
    Activity.Finish
End Sub
```

Kode Program Form Encryption:

```vbscript
#Region  Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
#End Region

Sub Process_Globals
    End Sub

Sub Globals
    Private btnProses As Button
    Private txtPlainText As EditText
    Dim d As DES
    Dim c As CTC
    Private spJenisEnkripsi As Spinner
    Private txtChiperText As EditText
End Sub
```
Private lblWaktu As Label
Private startEx As Long
End Sub

Sub Activity_Create(FirstTime As Boolean)
Activity.LoadLayout("Encryption")
Activity.Title = "Proses Enkripsi"
Activity.AddMenuItem("Home", "Home")
Activity.AddMenuItem("Setting", "Setting")
Activity.AddMenuItem("About", "About")
Activity.AddMenuItem("Exit", "Exit")
spJenisEnkripsi.Add("CTC")
spJenisEnkripsi.Add("DES")
spJenisEnkripsi.Add("CTC - DES")
d.Initialize
c.Initialize
End Sub

Sub Activity_Resume
End Sub

Sub Activity_Pause (UserClosed As Boolean)
End Sub

Sub btnProses_Click
startEx = DateTime.Now
Dim selected As String
Dim plainText As String
Dim keyDES As String
Dim KeyCTC As String
keyDES = Setting.keyDES
KeyCTC = Setting.keyCTC
selected = spJenisEnkripsi.SelectedItem
If keyDES.Length = 8 And KeyCTC.Length = 0 Then
    plainText = txtPlainText.Text.Trim
    If selected = "CTC" Then
        txtChiperText.Text = c.enkripsi(plainText,KeyCTC)
        Dim we As Long = DateTime.Now-startEx
        lblWaktu.Text = "Waktu Eksekusi : ",we," ms"
    Else If selected = "DES" Then
        If plainText.Length MOD 8 < 8 And plainText.Length MOD 8 > 0 Then
            Dim count As Int = plainText.Length MOD 8
            Do While count < 8
                plainText = plainText & " "
                count = count + 1
            Loop
        End If
        Dim i As Int = 0
        Dim pos As Int = 8
        Dim chiperDES As String = ""
        Do While i < plainText.Length/8
            chiperDES = chiperDES & d.enkripsi(plainText.Substring(pos-8,pos),keyDES)
            i = i + 1
            pos = pos + 8
        Loop
    End If
End If
End Sub
txtChiperText.Text = chiperDES
Dim we As Long = DateTime.Now-startEx
lblWaktu.Text = "Waktu Eksekusi : ",&we&" ms"
Else
Dim chiperCTC As String =
c.enkripsi(plainText,KeyCTC)
If chiperCTC.Length MOD 8 < 8 And chiperCTC.Length MOD 8 > 0 Then
    Dim count As Int = chiperCTC.Length MOD 8
    Do While count < 8
        chiperCTC = chiperCTC & " "
        count = count + 1
    Loop
End If
Dim i As Int = 0
Dim pos As Int = 8
Dim chiperDES As String = ""
Do While i < chiperCTC.Length/8
    chiperDES = chiperDES &
    d.enkripsi(chiperCTC.Substring(pos-8,pos),keyDES)
    i = i + 1
    pos = pos + 8
Loop
txtChiperText.Text = chiperDES
Dim we As Long = DateTime.Now-startEx
lblWaktu.Text = "Waktu Eksekusi : ",&we&" ms"
End If
Else
    MsgBox("Kunci DES harus tepat 8 karakter dan kunci CTC
tidak boleh kosong, ubah melalui menu Setting!","Kesalahan")
End If
End Sub

Sub home_click
    StartActivity("Home")
    Activity.Finish
End Sub

Sub setting_click
    StartActivity("Setting")
    Activity.Finish
End Sub

Sub about_click
    StartActivity("About")
    Activity.Finish
End Sub

Sub exit_click
    ExitApplication
    Activity.Finish
End Sub

Kode Program Form Decryption:

#Region  Activity Attributes
    #FullScreen: False
    #IncludeTitle: True
Sub Process_Globals
End Sub

Sub Globals
Dim d As DES
Dim c As CTC
Private btnProses As Button
Private txtChiperText As EditText
Private spJenisDekripsi As Spinner
Private lblWaktu As Label
Private startEx As Long
Private txtPlainText As EditText
End Sub

Sub Activity_Create(FirstTime As Boolean)
Activity.LoadLayout("decryption")
Activity.Title = "Proses Dekripsi"
Activity.AddMenuItem("Home", "Home")
Activity.AddMenuItem("Setting", "Setting")
Activity.AddMenuItem("About", "About")
Activity.AddMenuItem("Exit", "Exit")

spJenisDekripsi.Add("CTC")
spJenisDekripsi.Add("DES")
spJenisDekripsi.Add("CTC - DES")
d.Initialize
c.Initialize
End Sub

Sub Activity_Resume
End Sub

Sub Activity_Pause (UserClosed As Boolean)
End Sub

Sub btnProses_Click
startEx = DateTime.Now
Dim chiperText As String
Dim keyDES As String
Dim KeyCTC As String
Dim selected As String
chiperText = txtChiperText.Text
keyDES = Setting.keyDES
KeyCTC = Setting.keyCTC
selected = spJenisDekripsi.SelectedItem
If keyDES.Length = 8 And KeyCTC.Length > 0 Then
  If selected = "CTC" Then
    If chiperText.Length Mod KeyCTC.Length <> 0 Then
      ToastMessageShow("Panjang Karakter Chiper text tidak sesuai!",True)
      Return
    End If
  End If
  txtPlainText.Text = c.dekripsi(chiperText,KeyCTC)
End Sub
Dim we As Long = DateTime.Now - startEx
lblWaktu.Text = "Waktu Eksekusi : " & we & " ms"
Else If selected = "DES" Then
    If chiperText.Length Mod keyDES.Length <> 0 Then
        ToastMessageShow("Panjang Karakter Chiper text tidak sesuai!", True)
        Return
    End If
    Dim i As Int = 0
    Dim pos As Int = 16
    Dim plainDes As String = ""
    Do While i < chiperText.Length / 16
        plainDes = plainDes &
        d.dekripsi(chiperText.Substring(16, pos), keyDES)
        i = i + 1
        pos = pos + 16
    Loop
    txtPlainText.Text = plainDes
    Dim we As Long = DateTime.Now - startEx
    lblWaktu.Text = "Waktu Eksekusi : " & we & " ms"
Else
    If chiperText.Length Mod keyDES.Length <> 0 Then
        ToastMessageShow("Panjang Karakter Chiper text tidak sesuai!", True)
        Return
    End If
    Dim i As Int = 0
    Dim pos As Int = 16
    Dim plainDes As String = ""
    Do While i < chiperText.Length / 16
        plainDes = plainDes &
        d.dekripsi(chiperText.Substring(16, pos), keyDES)
        i = i + 1
        pos = pos + 16
    Loop
    Log("CTC-DES : " & plainDes.Length & "-" & plainDes)
    plainDes = plainDes.Trim
    Dim m As Int = plainDes.Length Mod KeyCTC.Length
    i = 0
    Do While m > 0 And i < KeyCTC.Length - m
        plainDes = plainDes & " "
        i = i + 1
    Loop
    txtPlainText.Text = c.dekripsi(plainDes, KeyCTC)
    Dim we As Long = DateTime.Now - startEx
    lblWaktu.Text = "Waktu Eksekusi : " & we & " ms"
End If
Else
    MsgBox("Kunci DES harus tepat 8 karakter dan kunci CTC tidak boleh kosong, ubah melalui menu Setting!", "Kesalahan")
End If

End Sub

Sub spJenisDekripsi_ItemClick (Position As Int, Value As Object)
    Dim val As String
    val = Value
    If val = "CTC" Then
        ToastMessageShow("CTC", True)
Else If val = "DES" Then
    ToastMessageShow("DES", True)
Else
    ToastMessageShow("CTC - DES", True)
End If
End Sub

Sub home_click
    StartActivity("Home")
    Activity.Finish
End Sub

Sub setting_click
    StartActivity("Setting")
    Activity.Finish
End Sub

Sub about_click
    StartActivity("About")
    Activity.Finish
End Sub

Sub exit_click
    ExitApplication
    Activity.Finish
End Sub

Kode Program Conversion:

Sub Class_Globals
End Sub

Public Sub Initialize
End Sub

Sub formatBinary(ch As Char)
    Dim str As String
    str = Bit.ToBinaryString(Asc(ch))
    For i=1 To 8-str.Length
        str = "0" & str
    Next
    Return str
End Sub

Sub plainToBinary(plain As String) As String
    Dim str As String
    For i=0 To plain.Length-1
        str = str & formatBinary(plain.CharAt(i))
    Next
    Return str
End Sub

Sub stringToDecimal(str As String)
    Dim res As Int
    For i=0 To str.Length-1
        If str.charAt(i) = "1" Then
            res = res + Power(2, str.Length-1-i)
        End If
    Next
End Sub

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Sub decimalToBinary(a As Int)  
Dim str As String  
Dim res As String  
Dim temp As Int  
Do While (a > 0)  
    temp = a mod 2  
    a = a / 2  
    str = str & temp  
Loop  
For i = str.Length - 1 To 0 Step -1  
    res = res & str.CharAt(i)  
Next  
For i = 1 To 4 - res.Length  
    res = "0" & res  
Next  
Return res  
End Sub

Sub hexToBinary(chiper As String)  
Dim str As String  
Dim output As String = ""  
For i = 0 To chiper.Length - 1  
    str = chiper.CharAt(i)  
    str = str.Trim  
    If str.Trim.EqualsIgnoreCase("0") = True Then  
        output = output & "0000"  
    Else If str.EqualsIgnoreCase("1") = True Then  
        output = output & "0001"  
    Else If str.EqualsIgnoreCase("2") = True Then  
        output = output & "0010"  
    Else If str.EqualsIgnoreCase("3") = True Then  
        output = output & "0011"  
    Else If str.EqualsIgnoreCase("4") = True Then  
        output = output & "0100"  
    Else If str.EqualsIgnoreCase("5") = True Then  
        output = output & "0101"  
    Else If str.EqualsIgnoreCase("6") = True Then  
        output = output & "0110"  
    Else If str.EqualsIgnoreCase("7") = True Then  
        output = output & "0111"  
    Else If str.EqualsIgnoreCase("8") = True Then  
        output = output & "1000"  
    Else If str.EqualsIgnoreCase("9") = True Then  
        output = output & "1001"  
    Else If str.EqualsIgnoreCase("A") = True Then  
        output = output & "1010"  
    Else If str.EqualsIgnoreCase("B") = True Then  
        output = output & "1011"  
    Else If str.EqualsIgnoreCase("C") = True Then  
        output = output & "1100"  
    Else If str.EqualsIgnoreCase("D") = True Then  
        output = output & "1101"  
    Else If str.EqualsIgnoreCase("E") = True Then  
        output = output & "1110"  
    Else If str.EqualsIgnoreCase("F") = True Then  
        output = output & "1111"  
    End If  
Next  
Return output  
End Sub
Else If str.EqualsIgnoreCase("F") = True Then
    output = output & "1111"
End If
Next
Return output
End Sub

Sub binaryToHex(binary As String)
    Dim str As String
    Dim output As String = 

    For i=0 To binary.Length-1 Step 4
        str = binary.Substring(i,i+4)
        str = str.Trim
        If str.Trim.EqualsIgnoreCase("0000") = True Then
            output = output & "0"
        Else If str.EqualsIgnoreCase("0001") = True Then
            output = output & "1"
        Else If str.EqualsIgnoreCase("0010") = True Then
            output = output & "2"
        Else If str.EqualsIgnoreCase("0011") = True Then
            output = output & "3"
        Else If str.EqualsIgnoreCase("0100") = True Then
            output = output & "4"
        Else If str.EqualsIgnoreCase("0101") = True Then
            output = output & "5"
        Else If str.EqualsIgnoreCase("0110") = True Then
            output = output & "6"
        Else If str.EqualsIgnoreCase("0111") = True Then
            output = output & "7"
        Else If str.EqualsIgnoreCase("1000") = True Then
            output = output & "8"
        Else If str.EqualsIgnoreCase("1001") = True Then
            output = output & "9"
        Else If str.EqualsIgnoreCase("1010") = True Then
            output = output & "A"
        Else If str.EqualsIgnoreCase("1011") = True Then
            output = output & "B"
        Else If str.EqualsIgnoreCase("1100") = True Then
            output = output & "C"
        Else If str.EqualsIgnoreCase("1101") = True Then
            output = output & "D"
        Else If str.EqualsIgnoreCase("1110") = True Then
            output = output & "E"
        Else If str.EqualsIgnoreCase("1111") = True Then
            output = output & "F"
        End If
    Next
    Return output
End Sub

Sub binaryToString(hex As String)
    Dim convert As ByteConverter
    Dim h, temp, res As String
    h = binaryToHex(hex)
    For i=0 To h.Length-1 Step 2
        temp = h.Substring(i,i+2)
        res = res & convert.StringFromBytes(convert.HexToBytes(temp),"ASCII")
    Next
    Return res
End Sub
Kode Program Algoritma CTC:

Sub Class_Globals
End Sub

Public Sub Initialize
End Sub

Sub dekripsi(chiperText As String, key As String)
    Dim kolom As Int = key.Trim.Length
    Dim baris As Int

    baris = Ceil(chiperText.Length / kolom)
    Dim arrange As String = arrangeKey(key)
    'Log(arrange)
    Dim temp As String

    Dim get(kolom) As String
    Dim grid(baris,kolom) As String
    Dim i As Int = 0
    Log("leng ct ",chiperText.Length)
    For x = 0 To kolom-1
        temp = ""
        For y = 0 To baris-1
            Log("ct ",chiperText.CharAt(i))
            temp = temp & chiperText.CharAt(i)
            i = i+1
        Next
        get(x) = temp
    Next

    For x = 0 To kolom-1
        For y = 0 To kolom-1
            Dim s As String = arrange.CharAt(x)
            If s = y Then
                For z = 0 To baris-1
                    s = arrange.CharAt(y)
                    Dim index As Int = s
                    grid(z,y) = get(index).charAt(z)
                Next
            End If
        Next
    Next

    Dim dec As String = ""
    For x = 0 To baris-1
        For y = 0 To kolom-1
            dec = dec & grid(x,y)
        Next
    Next
End Sub
Sub enkripsi(plainText As String, key As String)
    Dim kolom As Int = key.Trim.Length
    Dim baris As Int = Ceil(plainText.Length / kolom)
    Dim arrange As String = arrangeKey(key)
    Dim grid(baris, kolom) As String
    Dim x, y, z As Int = 0
    For x = 0 To baris - 1
        For y = 0 To kolom - 1
            If (plainText.Length = z) Then
                grid(x, y) = " "
                z = z - 1
            Else
                grid(x, y) = plainText.charAt(z)
            End If
            z = z + 1
        Next
    Next
    Dim enc As String = "";
    For x = 0 To kolom - 1
        For y = 0 To kolom - 1
            Dim s As String = arrange.CharAt(y)
            If x = s Then
                For a = 0 To baris - 1
                    enc = enc & grid(a, y)
                Next
            End If
        Next
    Next
    Return enc
End Sub

Sub sort_key(key As String)
    Dim sf As StringFunctions
    sf.Initialize
    Dim l As List
    l.Initialize
    Dim i As Int
    For i = 0 To key.Length - 1
        l.Add(key.CharAt(i))
    Next
    l.Sort(True)
    Dim str As String
    str = ""
    For i = 0 To l.Size - 1
        str = str & l.Get(i)
    Next
    Return str
End Sub
Sub `arrangeKey`(key As String)
    Dim sortedKey As String
    sortedKey = sort_key(key)
    Dim num(key.Length) As Int
    For x = 0 To sortedKey.length-1
        For y = 0 To sortedKey.length-1
            If sortedKey.CharAt(x) = key.charAt(y) Then
                num(y) = x
                Exit
            End If
        Next
    Next
    Dim res As String
    For i = 0 To num.Length-1
        res = res & num(i)
    Next
    Return res
End Sub

Kode Program Algoritma DES:

Sub `Class_Globals`
    Dim IP() As Int
    Dim PC1() As Int
    Dim PC2() As Int
    Dim E() As Int
    Dim SB() As Object
    Dim PB() As Int
    Dim IIP() As Int
    Dim conv As Convertion
End Sub

Public Sub `Initialize`

End Sub

Sub `initWithIP`(biner As String) As String
    IP = Array As
        Int(58, 50, 42, 34, 26, 18, 10, 2, 60, 52, 44, 36, 28, 20, 12, 4, 62, 54, 46, 38, 30, 22, 1
        4, 6, 4, 56, 48, 40, 32, 24, 16, 8, 57, 49, 41, 33, 25, 17, 9, 1, 59, 51, 43, 35, 27, 19, 11,
        3, 61, 53, 45, 37, 29, 21, 13, 5, 63, 55, 47, 39, 31, 23, 15, 7)
    Dim str As String
    For i = 0 To 63
        str = str & biner.CharAt(IP(i) - 1)
    Next
    Return str
End Sub

Sub `initWithIPDec`(biner As String) As String
    IP = Array As
        Int(58, 50, 42, 34, 26, 18, 10, 2, 60, 52, 44, 36, 28, 20, 12, 4, 62, 54, 46, 38, 30, 22, 1
        4, 6, 4, 56, 48, 40, 32, 24, 16, 8, 57, 49, 41, 33, 25, 17, 9, 1, 59, 51, 43, 35, 27, 19, 11,
        3, 61, 53, 45, 37, 29, 21, 13, 5, 63, 55, 47, 39, 31, 23, 15, 7)
    Dim str As String
    For i = 0 To biner.Length-1
        For j = 0 To IP.Length-1
            If (i = IP(j) - 1) Then
                str = str & biner.CharAt(j)
            End If
        Next
    Next
    Return str
End Sub
Sub initPC1(biner As String)
    PC1 = Array As Int(57, 49, 41, 33, 25, 17, 9, 1, 58, 50, 42, 34, 26, 18, 10, 2, 59, 51, 43, 35, 27, 19, 11, 3, 60, 52, 44, 36, 63, 55, 47, 39, 31, 23, 15, 7, 62, 54, 46, 38, 30, 22, 14, 6, 61, 53, 45, 37, 29, 21, 13, 5, 28, 20, 12, 4)
    Dim str As String
    For i = 0 To 55
        str = str & biner.CharAt(PC1(i) - 1)
    Next
    Return str
End Sub

Sub initPC2(biner As String)
    PC2 = Array As Int(14, 17, 11, 24, 1, 5, 3, 28, 15, 6, 21, 10, 23, 19, 12, 4, 26, 8, 16, 7, 27, 20, 13, 2, 4, 1, 52, 31, 37, 47, 55, 30, 40, 51, 45, 33, 48, 44, 49, 39, 56, 34, 53, 46, 42, 50, 36, 29, 32)
    Dim str As String
    For i = 0 To 47
        str = str & biner.CharAt(PC2(i) - 1)
    Next
    Return str
End Sub

Sub leftShift(data() As String)
    Dim t_shift() As Int
    t_shift = Array As Int(1, 1, 2, 2, 2, 2, 2, 1, 2, 2, 2, 2, 2, 1)
    For i = 1 To 16
        For j = t_shift(i - 1) To 27
            data(i) = data(i) & data(i - 1).CharAt(j)
        Next
        For j = 0 To t_shift(i - 1) - 1
            data(i) = data(i) & data(i - 1).CharAt(j)
        Next
    Next
End Sub

Sub initE(biner As String)
    E = Array As Int(32, 1, 2, 3, 4, 5, 4, 5, 6, 7, 8, 9, 8, 9, 10, 11, 12, 13, 12, 13, 14, 15, 16, 17, 16, 17, 18, 19, 20, 21, 20, 21, 22, 23, 24, 25, 24, 25, 26, 27, 28, 29, 28, 29, 30, 31, 32, 1)
    Dim str As String = ""
    For i = 0 To 47
        str = str & biner.CharAt(E(i) - 1)
    Next
    Return str
End Sub

Sub exOR(r As String, k As String)
    Dim str As String
    For i = 0 To r.Length - 1
        If (r.CharAt(i) = "1" And k.CharAt(i) = "0") Or (r.CharAt(i) = "0" And k.CharAt(i) = "1") Then
            str = str & r.CharAt(i)
        Else
            str = str & k.CharAt(i)
        End If
    Next
    Return str
End Sub
Sub sbox(input As String)
    Dim sb1() As Int
    Dim sb2() As Int
    Dim sb3() As Int
    Dim sb4() As Int
    Dim sb5() As Int
    Dim sb6() As Int
    Dim sb7() As Int
    Dim sb8() As Int
    Dim sbTemp() As Int
    sb1 = Array(14,13,1,2,15,11,8,3,10,6,12,5,9,0,7,0,15,7,4,14,2,13,1,10
                 ,6,12,11,9,5,3,8,4,1,14,8,13,6,2,11,15,12,9,7,3,10,5,0,15,12,8
                 ,2,4,9,1,7,5,11,3,14,10,0,6,13)
    sb2 = Array(15,1,8,14,6,11,3,4,9,7,2,13,12,0,5,10,3,13,4,7,15,2,8,14,12
                 ,0,1,9,11,5,0,14,7,11,10,4,13,1,5,8,12,6,9,3,2,15,13,6,10,1,3
                 ,15,4,2,1,6,7,12,0,5,14,9)
    sb3 = Array(10,0,9,14,6,3,15,5,1,13,12,7,11,4,2,8,13,7,0,9,3,4,6,10,2
                 ,8,5,14,12,11,15,1,13,6,4,9,8,15,3,0,11,1,2,12,5,10,14,7,1,10
                 ,13,0,6,9,8,7,4,15,14,3,11,5,2,12)
    sb4 = Array(7,13,14,3,0,5,9,10,1,2,8,5,11,12,4,15,13,8,11,5,6,15,0,3,4
                 ,7,2,12,1,10,14,9,10,6,9,0,12,11,7,13,15,1,3,14,5,2,8,4,3,15
                 ,0,6,10,1,13,8,9,4,5,11,12,7,2,14)
    sb5 = Array(12,1,10,15,9,2,6,8,0,13,3,4,14,7,5,11,10,15,4,2,7,12,9,5
                 ,6,1,13,14,0,11,3,8,9,14,15,5,2,8,12,3,1,5,0,4,10,1,13,11,6
                 ,4,3,2,12,9,5,15,10,1,14,1,7,6,0,9,13)
    sb6 = Array(2,12,4,1,7,10,11,6,8,5,3,15,13,0,14,9,14,11,2,12,4,7,13,1
                 ,5,0,15,10,3,9,8,6,4,2,1,11,10,13,7,8,15,9,12,5,6,3,0,14,11,8
                 ,12,7,1,14,2,13,6,15,0,9,10,4,5,3)
    sb7 = Array(4,11,2,14,15,0,8,13,3,12,9,7,5,10,6,1,13,0,11,7,4,9,1,10,14
                 ,3,5,1,2,15,8,6,1,4,11,13,12,3,7,14,10,15,6,8,0,5,9,2,6,11
                 ,13,8,1,4,10,7,9,5,0,15,14,2,3,12)
    sb8 = Array(13,2,8,4,6,15,11,1,10,9,3,14,5,0,12,7,1,15,13,8,10,3,7,4,12
                 ,5,6,1,0,14,9,2,7,11,4,1,9,12,14,2,0,6,10,13,15,3,5,8,2,1
                 ,14,7,4,10,8,13,15,12,9,0,3,5,6,11)
    sb = Array(sb1, sb2, sb3, sb4, sb5, sb6, sb7, sb8)

    Dim j, position, nilai As Int = 0
    Dim s(8), output, left, up As String
    For i = 0 To 7
        s(i) = input.Substring2(j, 6 * (i + 1))
        j = j + 6
    Next
End Sub
For i=0 To 7
    left=s(i).SubString2(0,1) & s(i).SubString2(5,6)
    up=s(i).SubString2(1,5)
    position=16* conv.stringToDecimal(left)+
    conv.stringToDecimal(up)
    sbTemp = SB(i)
    nilai=sbTemp(position)
    output = output & conv.decimalToBinary(nilai)
Next
Return output
End Sub

Sub pBox(biner As String)
    PB = Array As Int(16,7,20,21,29,12,28,17,1,15,23,26,5,18,31,10,2,8,24,14,32,27,3,9,
    19,13,30,6,22,11,4,25)
    Dim str As String
    For i=0 To 31
        str = str & biner.CharAt(PB(i) - 1)
    Next
    Return str
End Sub

Sub inversIP(biner As String)
    IIP = Array As Int(40,8,48,16,56,24,64,32,39,7,47,15,55,23,63,31,38,6,46,14,54,22,62,
    30,37,5,45,13,53,21,61,29,36,4,44,12,52,20,60,28,35,3,43,11,51,19,59,
    27,34,2,42,10,50,18,58,26,33,1,41,9,49,17,57,25)
    Dim str As String
    For i = 0 To biner.length-1
        str=str & biner.CharAt(IIP(i)-1)
    Next
    Return str
End Sub

Sub inversIPDec(biner As String)
    Dim IIP() As Int
    IIP = Array As Int(40,8,48,16,56,24,64,32,39,7,47,15,55,23,63,31,38,6,46,14,54,22,62,
    30,37,5,45,13,53,21,61,29,36,4,44,12,52,20,60,28,35,3,43,11,51,19,59,
    27,34,2,42,10,50,18,58,26,33,1,41,9,49,17,57,25)
    Dim str As String
    For i = 0 To biner.length-1
        For j=0 To biner.Length-1
            If(i = IIP(j)-1) Then
                str=str & biner.CharAt(j)
                Exit
            End If
        Next
    Next
    Return str
End Sub

Sub completeTextEnc(plain As String)
    Dim str As String = plain
    Dim l As Int
l = str.Length
Dim s As Int
s = l Mod 8
Log("S : ", s) - "-" & plain
Dim i As Int = 0
Do While s > 0 And i < 8 - s
    str = str & " "
    Log("Inside")
    i = i + 1
Loop
Return str
End Sub
Sub enkripsi(plainText As String, key As String)
    Dim l(17), r(17), c(17), d(17), eks(16), plain_biner, key_biner, k(17), a(16), b(16), p(16), RL As String
    plain_biner = conv.plainToBinary(completeTextEnc(plainText))
    key_biner = conv.plainToBinary(key)
    l(0) = initIP(plain_biner).SubString2(0, 32)
    r(0) = initIP(plain_biner).SubString2(32, 64)
    c(0) = initPC1(key_biner).SubString2(0, 28)
    d(0) = initPC1(key_biner).SubString2(28, 56)
    leftShift(c)
    leftShift(d)
    Dim cd As String
    For i = 1 To 16
        cd = c(i) & d(i)
        k(i) = initPC2(cd)
        eks(i - 1) = initE(r(i - 1))
        a(i - 1) = exOR(eks(i - 1), k(i))
        b(i - 1) = sbox(a(i - 1))
        p(i - 1) = pBox(b(i - 1))
        l(i) = r(i - 1)
        r(i) = exOR(l(i - 1), p(i - 1))
    Next
    RL = r(16) & l(16)
    RL = inversIP(RL)
    Return conv.binaryToHex(RL)
End Sub
Sub dekripsi(chiperText As String, key As String)
    Dim l(17), r(17), c(17), d(17), eks(16), chiper_biner, key_biner, k(17), a(16), b(16), p(16), RL As String
    chiper_biner = conv.hexToBinary(chiperText)
    key_biner = conv.plainToBinary(key)
    chiper_biner = inversIPDec(chiper_biner)
    r(16) = chiper_biner.SubString2(0, 32)
    l(16) = chiper_biner.SubString2(32, 64)
    c(0) = initPC1(key_biner).SubString2(0, 28)
    d(0) = initPC1(key_biner).SubString2(28, 56)
    leftShift(c)
    leftShift(d)
    Dim cd As String
    For i = 16 To 1 Step -1
        cd = c(i) & d(i)
        k(i) = initPC2(cd)
        eks(i - 1) = initE(l(i))
        a(i - 1) = exOR(eks(i - 1), k(i))
        b(i - 1) = sbox(a(i - 1))
    Next
End Sub
\[
p(i-1) = pBox(b(i-1)) \\
r(i-1) = l(i) \\
l(i-1) = \text{exOR}(r(i), p(i-1))'
\]

Next

RL = l(0) & r(0)
RL = initIPDec(RL)
Return conv.binaryToString(RL)
End Sub
LAMPIRAN B

DAFTAR RIWAYAT HIDUP

DATA PRIBADI

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PENDIDIKAN FORMAL

<table>
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<tr>
<td>2011 – 2017</td>
<td>S1 Ilmu Komputer Universitas Sumatera Utara, Medan</td>
</tr>
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<td>SMA Budi Mulia, Pematangsiantar</td>
</tr>
<tr>
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<td>SMP Cinta Rakyat 1, Pematangsiantar</td>
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<td>SD Kalam Kudus, Pematangsiantar</td>
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</tbody>
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PENGALAMAN ORGANISASI DAN KEGIATAN ILMIAH

- Anggota Palang Merah Remaja (PMR) SMP Cinta Rakyat 1 Pematangsiantar 2006-2007
- Anggota Kelompok Ilmiah Remaja (KIR) SMP Cinta Rakyat 1 Pematangsiantar 2006-2007
- Anggota Ekstrakurikuler Futsal SMP Cinta Rakyat 1 Pematangsiantar 2007-2008
- Anggota Liga Futsal Imilkom 2013-2015
- Praktek Kerja Lapangan Balai Besar Meteorologi Klimatologi dan Geofisika Wilayah I Medan Juni-Juli 2014
- Forum Moderator Gamebasics Netherland untuk Indonesia 2014-2017