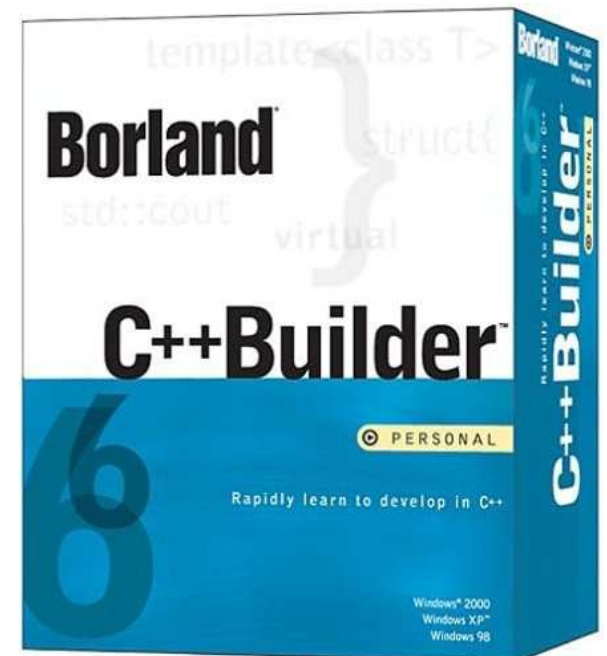# Algoritma Pemrograman

GUI Programming 2

Tipe Data BCB

- Numerik
  - int
  - float
  - char
  - double
- Non Numerik
  - AnsiString
- Tipe bentukan:
  - array, enum, struct

Konversi tipe Data

- **String to Integer**
  - StrToInt
- **String to Float / Double**
  - StrToFloat
- **String to DateTime**
  - StrToDateTime
- **Integer to AnsiString**
  - IntToStr
- **DateTime to AnsiString**
  - DateTimeToStr
  - DateTimeToString

```
int a = 2;
float b = 3.5;
String d = "anton";
AnsiString e = "antonius";
TDateTime f = Now();

d = FloatToStr(b);
ShowMessage(d);

d = IntToStr(a);
ShowMessage(d);

d = DateTimeToStr(f);
ShowMessage(d);
```

Konversi ke AnsiString

- A character:
  ```
  char Sign = 'q';
  Edit1->Text = AnsiString(Sign);
  ```

- An interger:
  ```
  Integer Number = 808;
  Caption->Text = AnsiString(Number);
  ```

- A long integer:
  ```
  long Value = 497783L;
  Panel1->Caption = AnsiString(Value);
  ```

- A floating-point value:
  ```
  Float Distance = 1205.62;
  Label1->Caption = AnsiString(Distance);
  ```

- A double-precision number:
  ```
  Double YearlyIncome = 24588;
  Edit1->Text = AnsiString(YearlyIncome);
  ```

- A string:
  ```
  AnsiString Food = "Peanut Butter";
  Button2->Caption = AnsiString(Food);
  ```

Demo

- Perhitungan Luas Persegi Panjang
- Validasi username dan password

Penggunaan Komponen

- Setting semua **properties** dengan tepat
  - Perhatikan **tipe data** masing-masing property
- Pilih **events** yang sesuai / yg diinginkan
  - Isikan kode yang ingin dijalankan pada event tersebut
- Perhatikan cara **mendesain** program aplikasi visual

Komponen BCB VCL

- **Visual**: dapat dilihat pada design time
- **Non visual**: tidak dapat dilihat pada design time
- Common properties:
  - Name, align, color, cursor, enabled, font, hint, width, height, taborder, left, top, visible
- Common events:
  - onClick, onDblClick, onEnter, onExit, onChange, onKeyX, onMouseX

Layout komponen pada layar
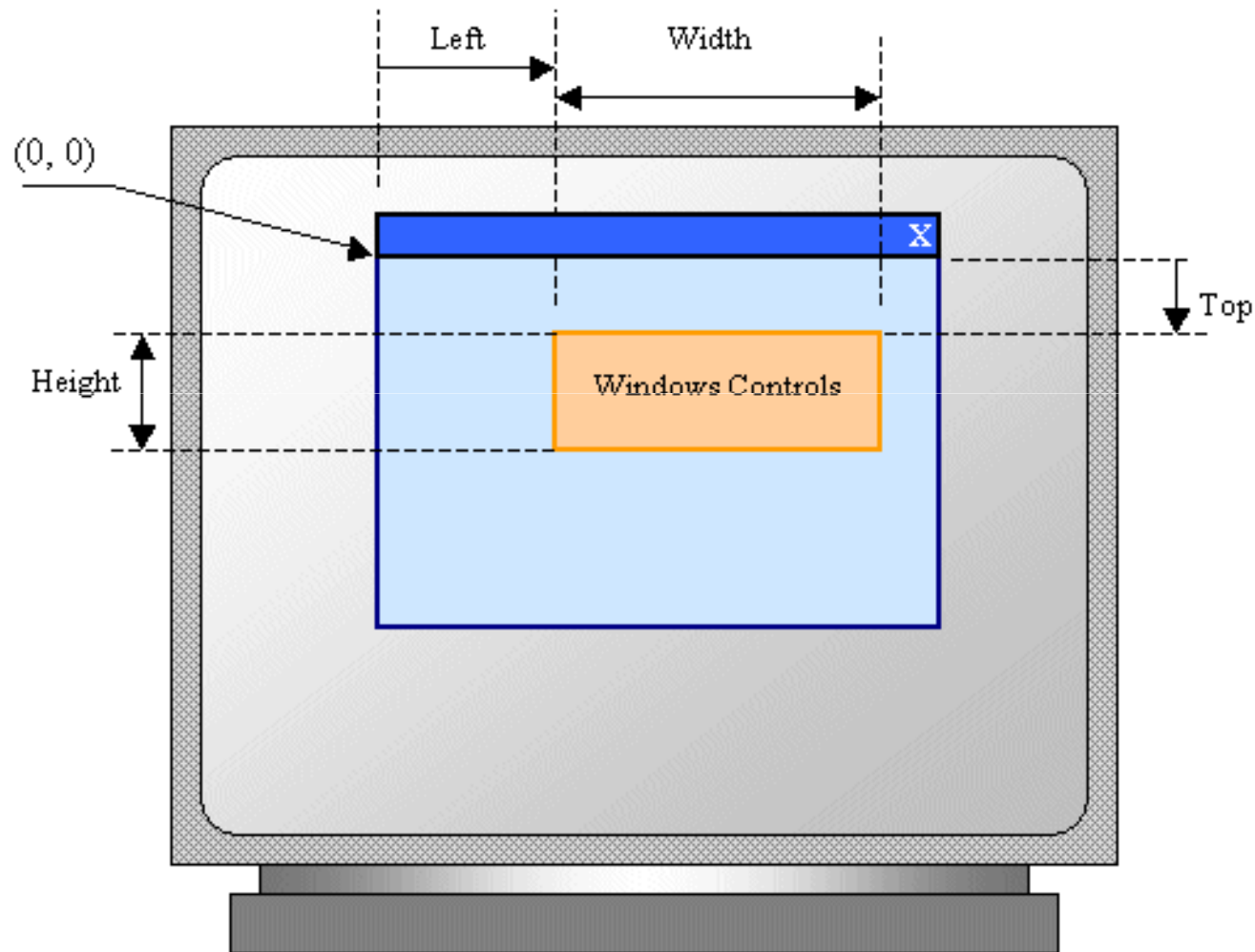
Kode Virtual Keyboard

Virtual Key	Used for	Virtual Key	Used for
VK_F1	F1	VK_F2	F2
VK_F3	F3	VK_F4	F4
VK_F5	F5	VK_F6	F6
VK_F7	F7	VK_F8	F8
VK_F9	F9	VK_F10	F10
VK_F11	F11	VK_F12	F12
VK_SCROLL	Scroll Lock	VK_SNAPSHOT	Prt Scrn (Depends on keyboard)
VK_PAUSE	Pause/Break	VK_TAB	Tab
VK_BACK	Backspace	VK_CAPITAL	Caps Lock
VK_SHIFT	Shift	VK_CONTROL	Ctrl
VK_MENU	Alt	VK_ESCAPE	Escape
VK_RETURN	Enter	VK_SPACE	Space Bar
VK_INSERT	Insert	VK_HOME	Home
VK_PRIOR	Page Up	VK_DELETE	Delete
VK_END	End	VK_NEXT	Page Down
VK_UP	Up Arrow Key	VK_RIGHT	Right Arrow Key
VK_DOWN	Down Arrow Key	VK_LEFT	Left Arrow Key
VK_LWIN	Left Windows Key	VK_RWIN	Right Windows Key
VK_APPS	Applications Key		

Numeric Keyboard

VK_NUMLOCK	Num Lock		
VK_NUMPAD0	0	VK_NUMPAD1	1
VK_NUMPAD2	2	VK_NUMPAD3	3
VK_NUMPAD4	4	VK_NUMPAD5	5
VK_NUMPAD6	6	VK_NUMPAD7	7
VK_NUMPAD8	8	VK_NUMPAD9	9
VK_DIVIDE	/	VK_MULTIPLY	*
VK_SUBTRACT	-	VK_ADD	+
VK_SEPARATOR		VK_DECIMAL	.

Syarat KeyPreview = true

Shift, Alt, dan Ctrl

Value	Description
ssShift	One of the Shift keys was pressed
ssAlt	One of the Alt keys was pressed
ssCtrl	One of the Ctrl keys was pressed

Mouse Button

Value	Description
mbLeft	The left mouse button was clicked
mbRight	The right mouse button was clicked
mbMiddle	The middle mouse button was clicked

Value	Description
ssShift	One of the **Shift** keys was pressed
ssAlt	One of the Alt keys was pressed
ssCtrl	One of the Ctrl keys was pressed
ssLeft	The left mouse button was held down
ssRight	The right mouse button was held down
ssMiddle	The middle mouse button was held down
ssDouble	The *Button* was double-clicked

MessageBox

int __fastcall MessageBox(const char * Message, const char * Caption, int Flags);
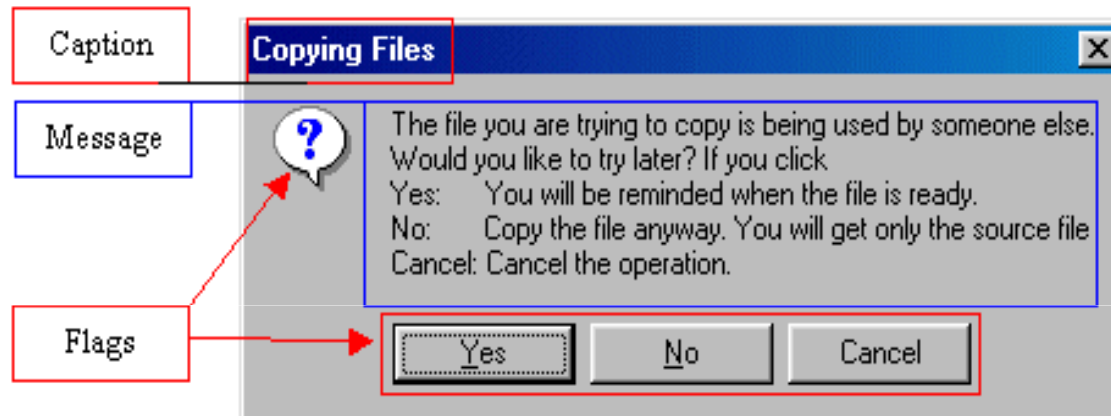
Constant Integer	Button(s)		
MB_OK		OK	
MB_OKCANCEL		OK	Cancel
MB_ABORTRETRYIGNORE	Abort	Retry	Ignore
MB_YESNOCANCEL	Yes	No	Cancel
MB_YESNO		Yes	No
MB_RETRYCANCEL		Retry	Cancel
MB_CANCELTRYCONTINUE	Cancel	Try Again	
MB_HELP		Help	

MessageBox

Value	Icon	Suited When
MB_ICONEXCLAMATION MB_ICONWARNING	⚠️	Warning the user of an action performed on the application.
MB_ICONINFORMATION MB_ICONASTERISK	ℹ️	Informing the user of a non-critical situation.
MB_ICONQUESTION	❓	Asking a question that expects a Yes, No, or Cancel answers.
MB_ICONSTOP MB_ICONERROR MB_ICONHAND	❌	A critical situation or error has occurred. This icon is appropriate when informing the user of a termination or deniability of an action.

Constant Value	If the message box has more than one button, the default button would be
MB_DEFBUTTON1	The first button
MB_DEFBUTTON2	The second button
MB_DEFBUTTON3	The third button
MB_DEFBUTTON4	The fourth button

MessageBox return

The MessageBox() returns	If the user clicks
IDOK	OK
IDCANCEL	Cancel or presses Esc
IDABORT	Abort
IDRETRY	Retry
IDIGNORE	Ignore
IDNO	No
IDYES	Yes
IDCONTINUE	Continue
IDTRYAGAIN	Try Again

Demo

- Project GUI2

Prinsip UID

- Interface harus mudah dikenali -> **familiar**
- Desain bersifat **konsisten**
  - Contoh : menu
- **Building for user**:
  - User tidak pernah salah? **UNDO**
  - User harus tahu apa yang terjadi
  - User tidak ingin menunggu lama
  - Berikan user pertolongan
- Pilih **warna** yang tepat
- Pilih komponen yang sesuai **fungsinya**
- **Minimal surprise** -> as real world
- Perhatikan keberagaman (**diversity**)
  - Hati-hati dengan pemilihan simbol / icon

Familiar – Office systems
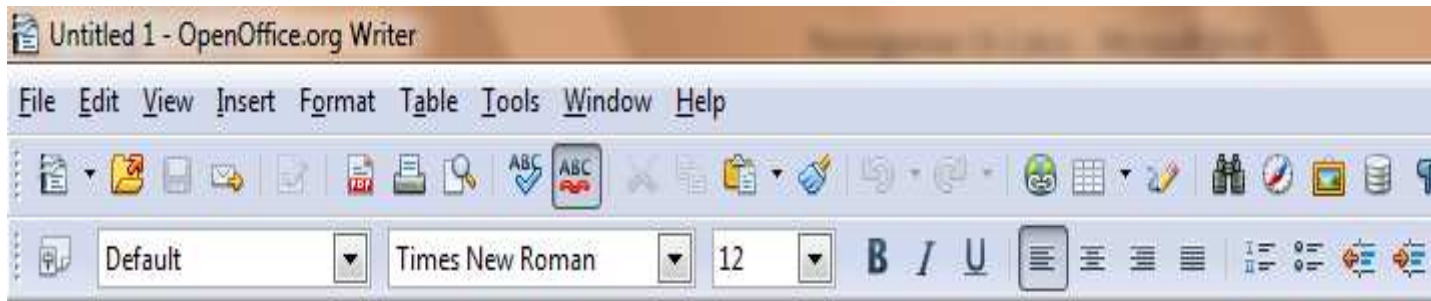
Penggunaan Icon - Archiver
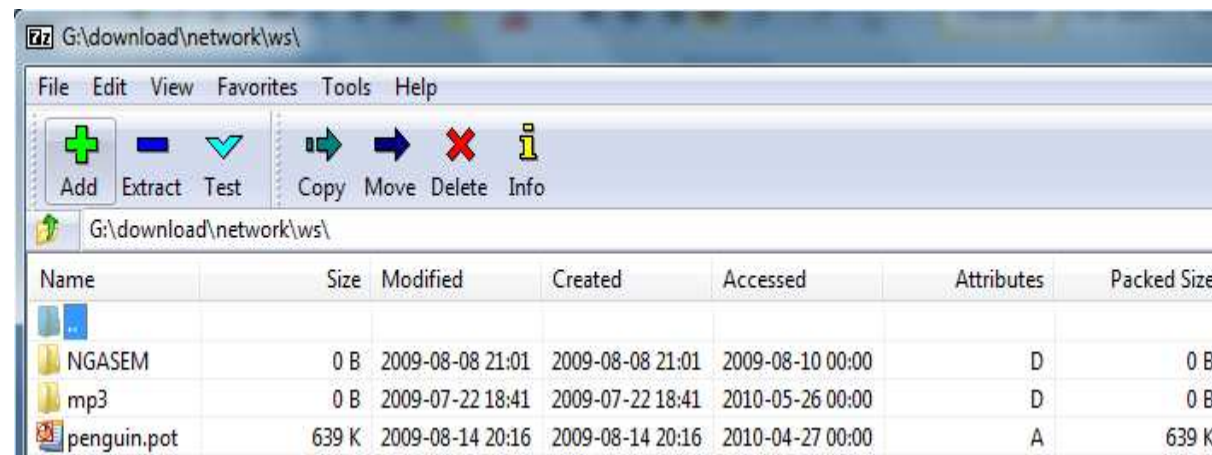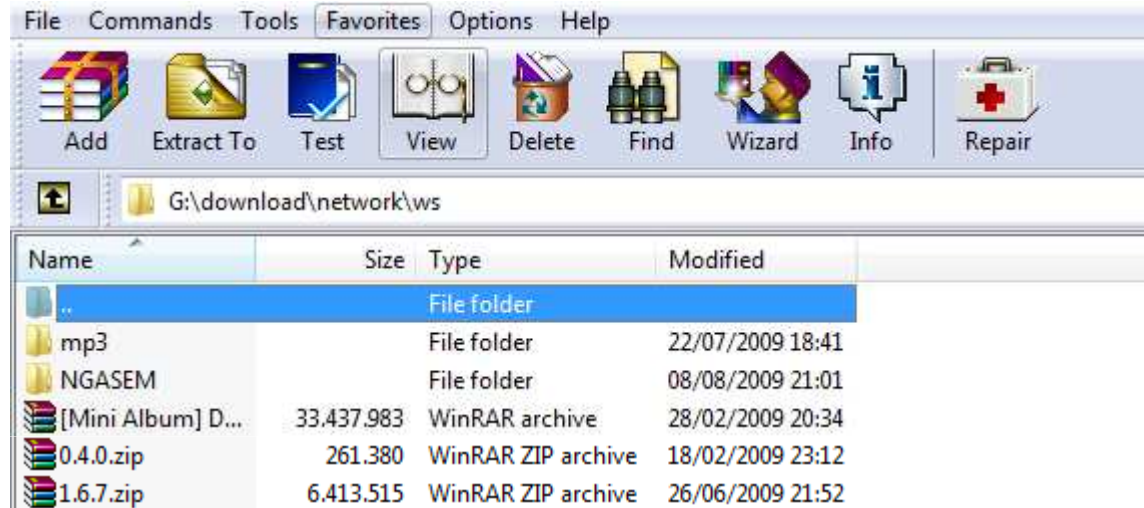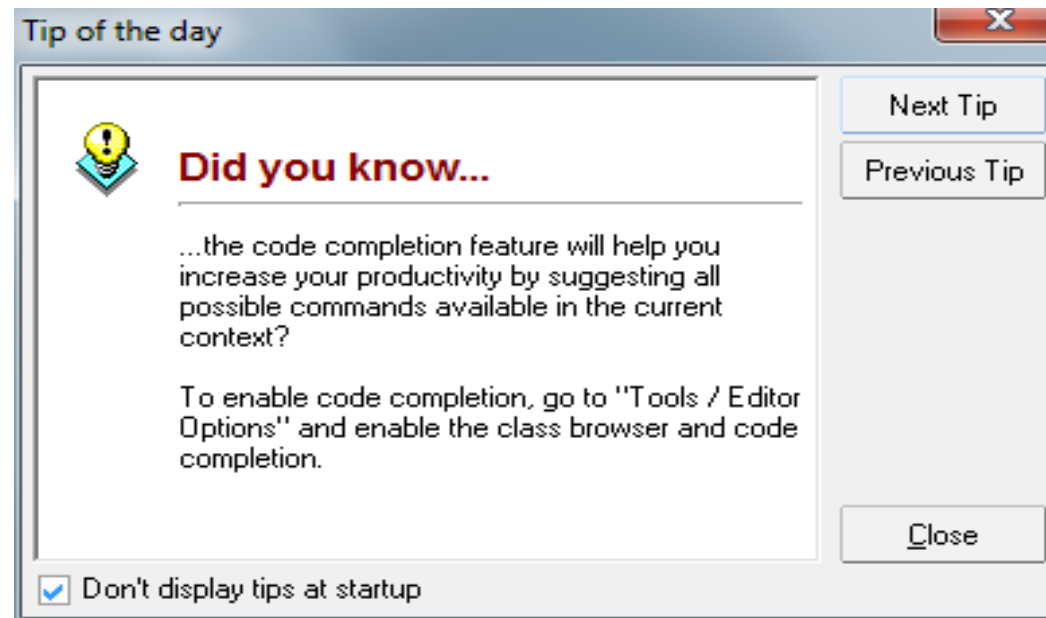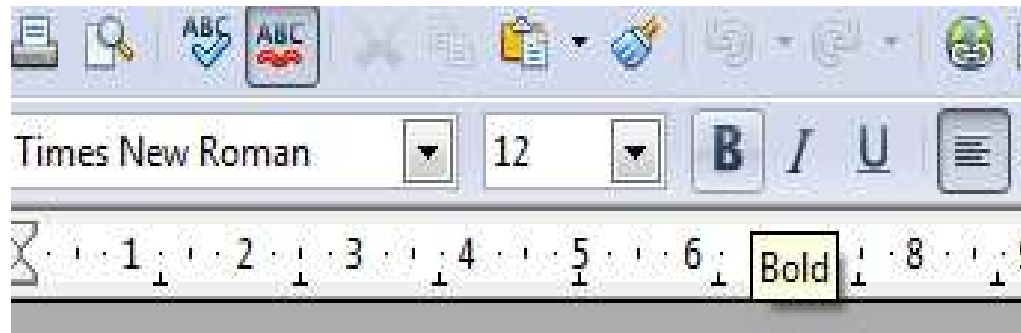
Konsistensi – Notepad & DevC++
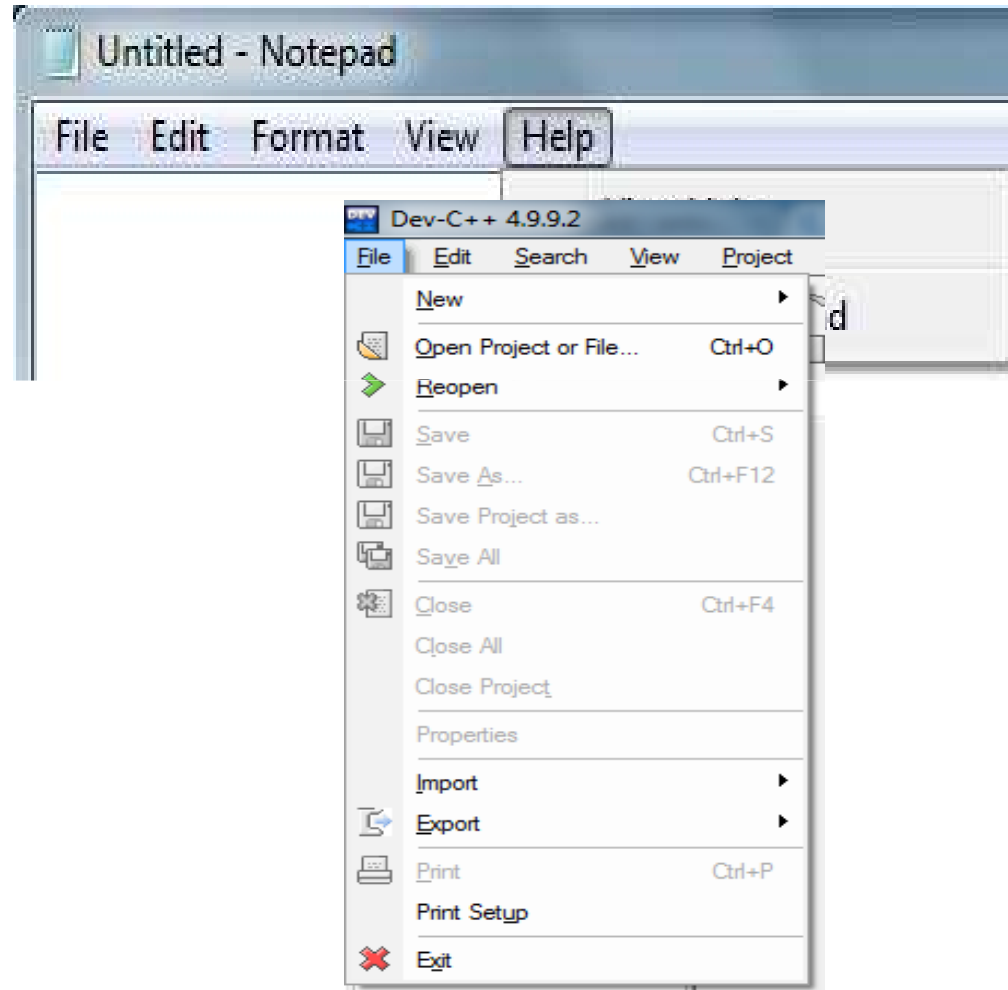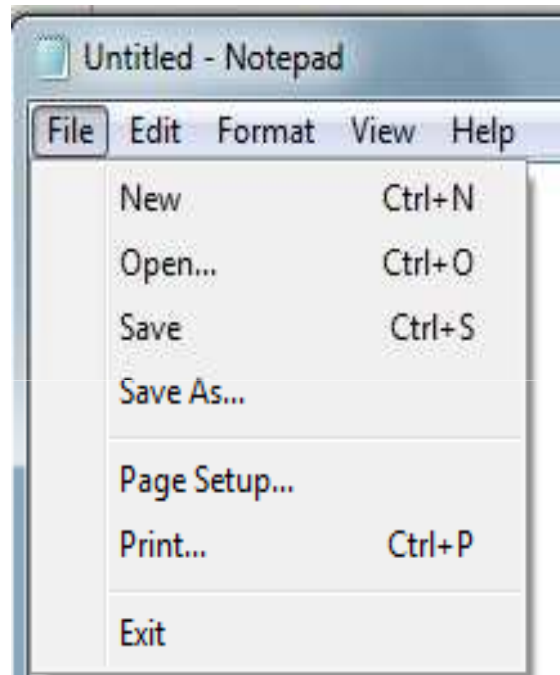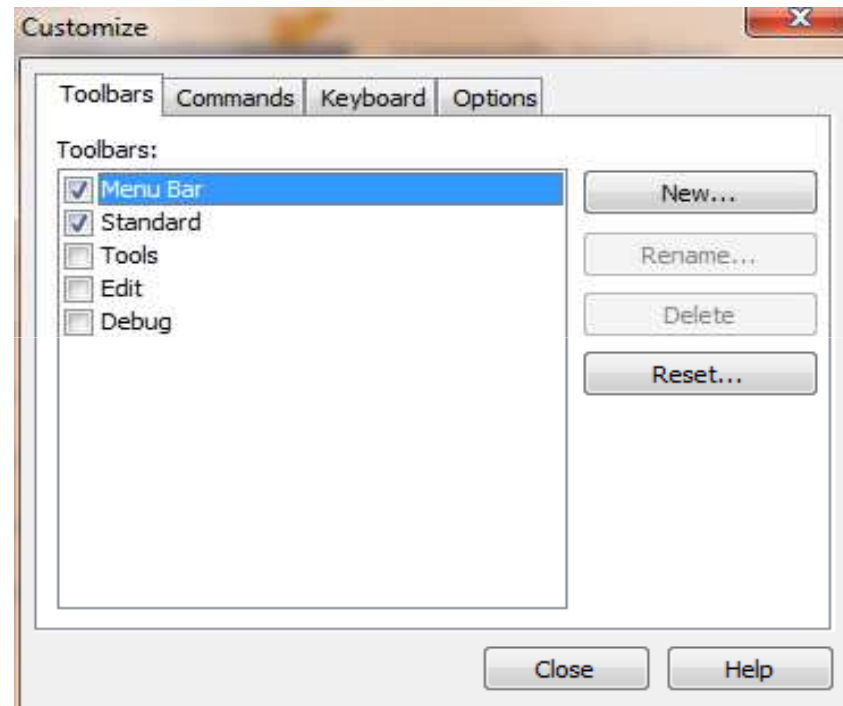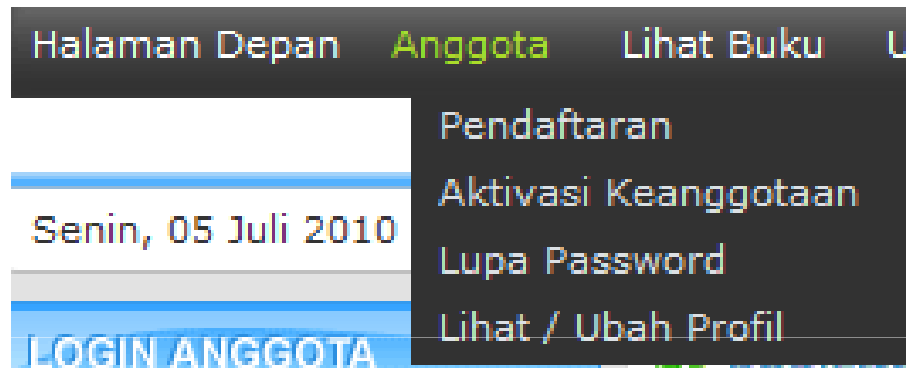
Undo - Redo
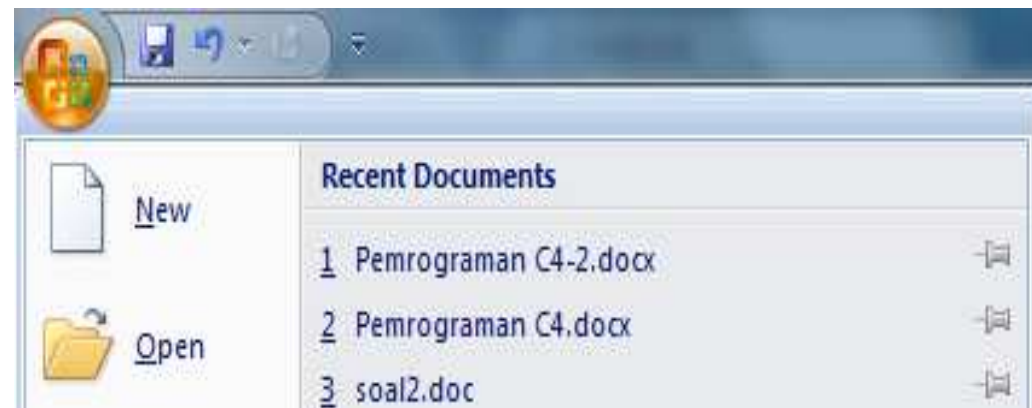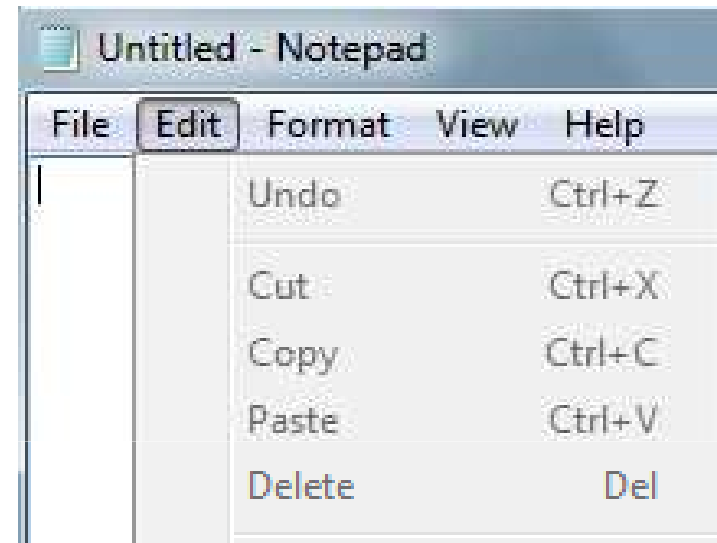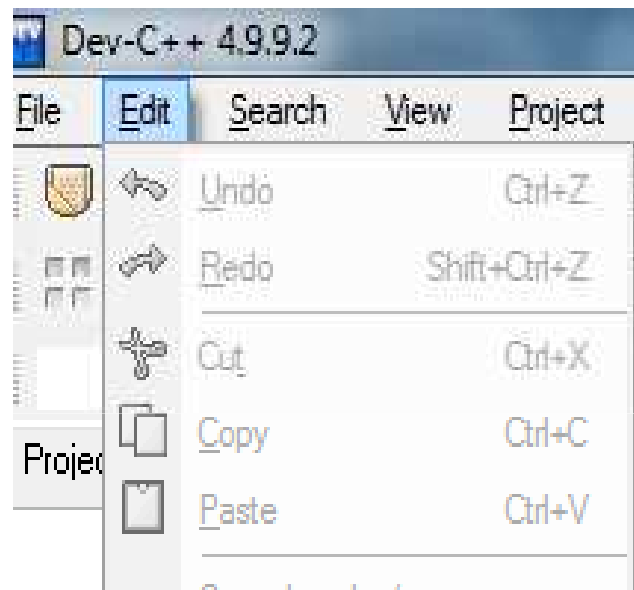
Progress Report
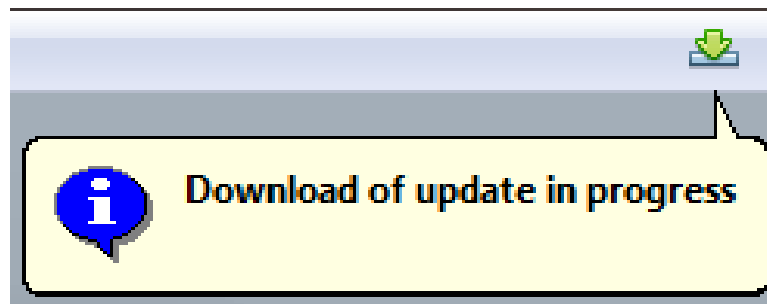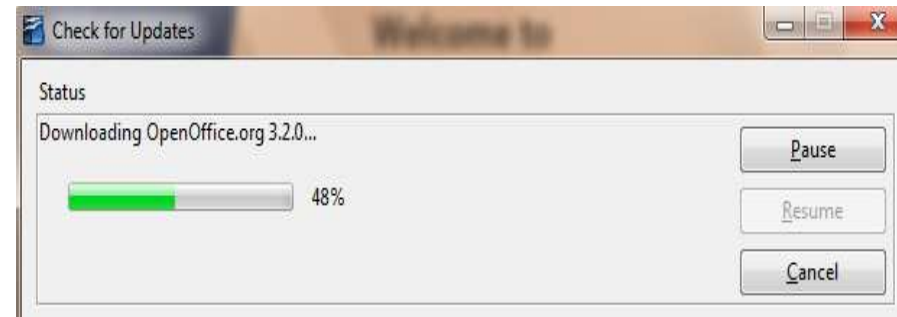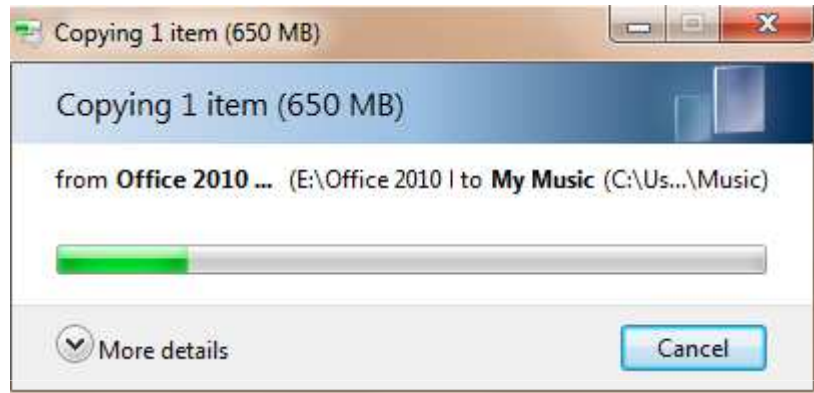
Pertolongan

Tipe Interaksi Visual

- Interaksi langsung:
  - Misal: delete file
- Interaksi melalui menu / pilihan
  - Menu pulldown maupun popup
- Pengisian form:
  - Misal registrasi Facebook
- Command line:
  - Misal konsole Linux
- Pencarian dengan bahasa alami (*natural language*)
  - Seperti pada search engine dan SQL / query

Interaksi melalui menu

Formulir pendaftaran

Data Alamat

Nama Negara : [Indonesia ▾] *

Nama Propinsi : [Pilih Propinsi ▾] *

Nama Kota/Wilayah : [Pilih Kota/Wilayah ▾] *

Jika Lainnya : [   ]

Alamat

: *

Kode Pos : [   ] * (diisi 5 digit angka)

Panduan Lihat Kode Pos: Pos Indonesia atau Filateli

Data Pribadi

Jenis Kelamin : ○ Laki - Laki ○ Perempuan *

Nama Lengkap : [   ] *

Tanggal Lahir : [▾] - [▾] - [▾] *

Alamat Email : [   ] * (contoh:abc@yahoo.com)

Data No. Kontak

No. Telepon : [   ] * (Salah satu dari Telepon dan

No. Handphone : [   ] * Handphone harus diisi.)

No. Faksimili : [   ]

Diskusi di Mailing List BukuKita - bukukita@yahoogroups.com

Ikutan Mailing List : ○ Ya, ikutan. ○ Tidak ikutan. *

Informasi Login

Nama User : [   ] * (min. 3 digit[huruf/angka])

Natural language

Penyajian informasi

- Statis
  - Tidak berubah, biasanya ditampilkan diawal dan
- Dinamis
  - Berubah, misal progress bar
- Macam Informasi:
  - Digital => image, table
  - Analog => grafis, jam analog

Control Percabangan pada BCB

- Hitung Luas:
  - Persegi Panjang
  - Segitiga
  - Lingkaran

- Jika RadioButton dipilih salah satu, maka textbox yang tidak berguna akan tidak tampak
  - Set Visible = False
- Hitung luas sesuai pilihan: gunakan **IF**
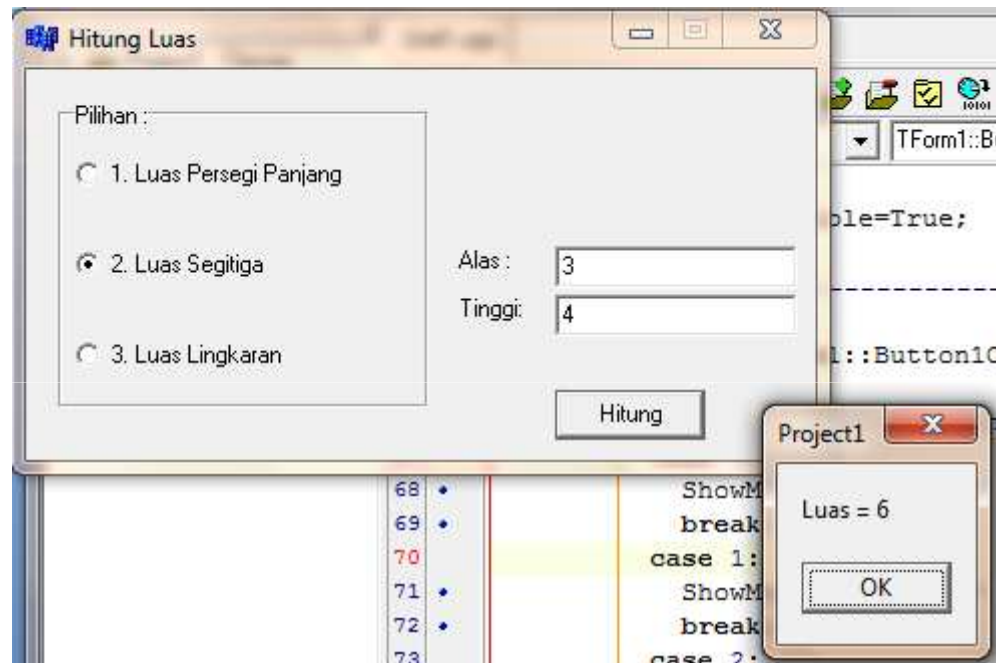- Project: **Modul13**

Property dan Events

- RadioButton1
  - Property: Caption, Items diisi 3 pilihan
  - Event: onClick
- Edit1 – 5
  - Property: Text dikosongkan, visible = False
- Label1 – 5
  - Property: Caption disesuaikan, visible = False
- Button
  - Property: Caption = Hitung Luas
  - Event : onClick

Kode

```cpp
void __fastcall TForm1::RadioGroup1Click(TObject *Sender)
{
        switch (RadioGroup1->ItemIndex){
          case 0:
            Edit1->Visible = True;
            Edit2->Visible = True;
            Edit3->Visible = False;
            Edit4->Visible = False;
            Edit5->Visible = False;
            Label1->Visible = True;
            Label2->Visible = True;
            La
            La
            La
            La
            br
          case
            Ed
            Ed
            Ed
            Ed
            Ed
            La
            La
            La
            La
            La
            br
          case
            Ed
            Ed
            Ed
            Edit4->Visible = False;
            Edit5->Visible = True;
            Label1->Visible = False;
            Label2->Visible = False;
            Label3->Visible = False;
            Label4->Visible = False;
            Label5->Visible = True;
            break;
        }
        Button1->Visible=True;
}
```
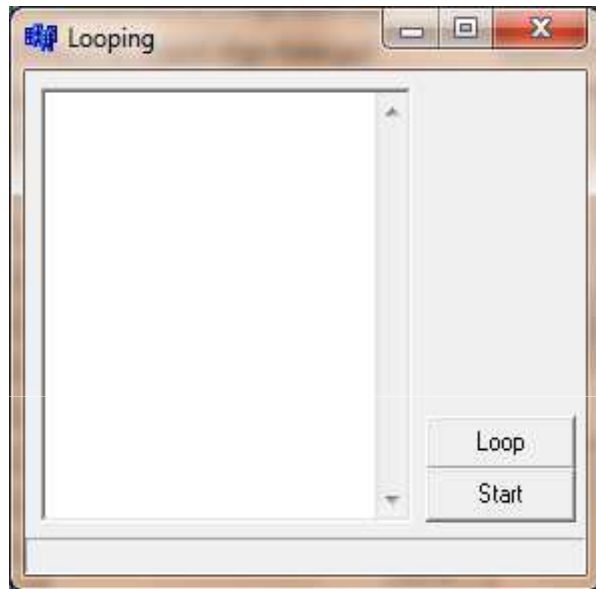
```cpp
void __fastcall TForm1::Button1Click(TObject *Sender)
{
        switch (RadioGroup1->ItemIndex){
            case 0:
              ShowMessage("Luas = " + IntToStr(StrToInt(Edit1->Text)*StrToInt(Edit2->Text)));
              break;
            case 1:
              ShowMessage("Luas = " + FloatToStr(0.5 * StrToFloat(Edit3->Text)*StrToFloat(Edit4->Text)))
              break;
            case 2:
              ShowMessage("Luas = " + FloatToStr(3.14 * StrToInt(Edit5->Text)*StrToInt(Edit5->Text)));
              break;
        }
}
```

Hasil Akhir

Contoh Struktur Perulangan

- Aplikasi Looping 1000 x dari array of Integer yang diisi nilai Acak

- Uji coba komponen Progressbar:
  - Berjalan maju dan mundur berdasarkan komponen Timer

Komponen Properties

- Memo1:
  - Property: Lines, ScrollBars=ssVertical
- Button1 dan Button2
  - Property: Caption
  - Event: Click
- Progressbar1
  - Property: Position, Min, dan Max
- Timer1
  - Property: Interval=100, Enabled=False
  - Event: OnTimer

Kode

- Buat variable global : bool maju = True
  - Untuk menandakan posisi gerak progressbar bertambah maju kekanan
- Gunakan fungsi Randomize() agar benar-benar random
  - Gunakan fungsi random(x) => nilai acak 0-x
 - Harus ditambah 1 agar nilai 0 tidak muncul

```cpp
void __fastcall TForm1::Button1Click(TObject *Sender)
{
    Button1->Enabled = False;
    Button2->Enabled = False;
    int myarray[1000] = {0};
    Randomize();
    ProgressBar1->Position=0;
    for (int i=0;i<1000;i++){
        myarray[i] = r
        Memo1->Lines->A
        ProgressBar1->P
    }
    Button1->Enabled
    Button2->Enabled
}

void __fastcall TForm1::Timer1Timer(TObject *Sender)
{
    if(maju){
        ProgressBar1->Position = ProgressBar1->Position + 1;
        if(ProgressBar1->Position==ProgressBar1->Max) maju = False;
    } else {
        ProgressBar1->Position = ProgressBar1->Position - 1;
        if(ProgressBar1->Position==ProgressBar1->Min) maju = True;
    }
}

void __fastcall TForm1
{
    if(Button2->Cap
        ProgressBar1->
        ProgressBar1->
        Timer1->Enable
        Button1->Enable       = False;
        Button2->Caption = "Stop";
    } else {
        ProgressBar1->Position = 0;
        ProgressBar1->Max=1000;
        Timer1->Enabled = False;
        Button1->Enabled = True;
        Button2->Caption = "Start";
    }
}
```
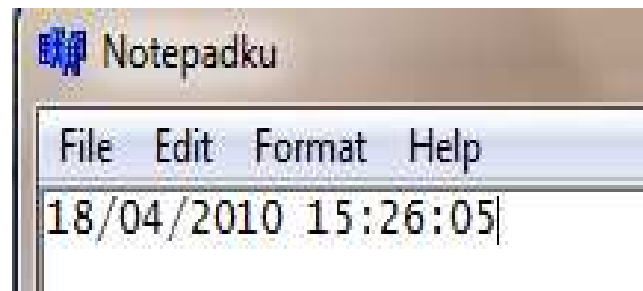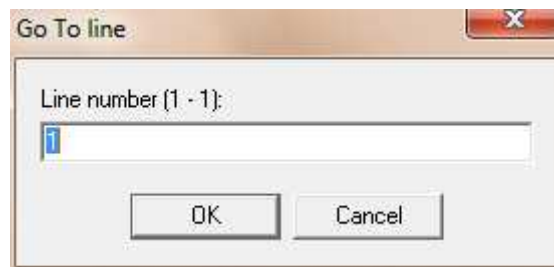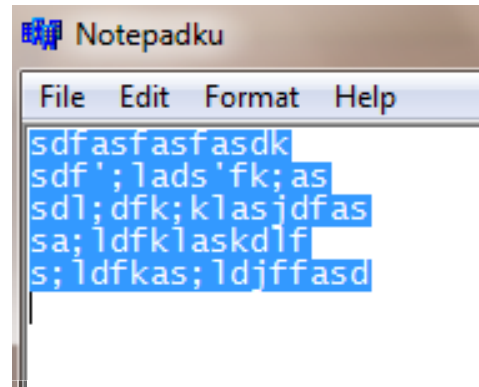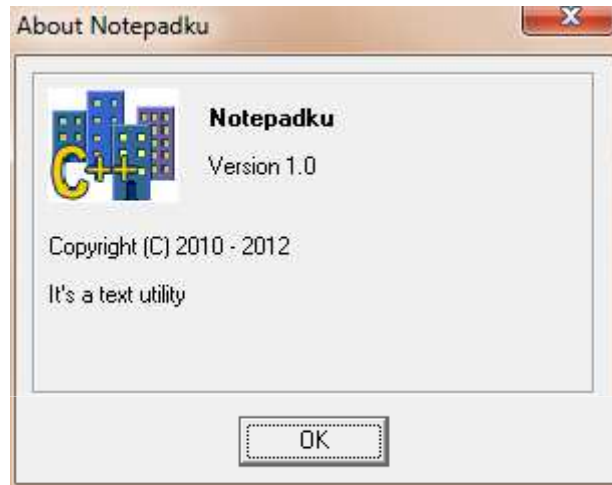
Demo NotepadKu
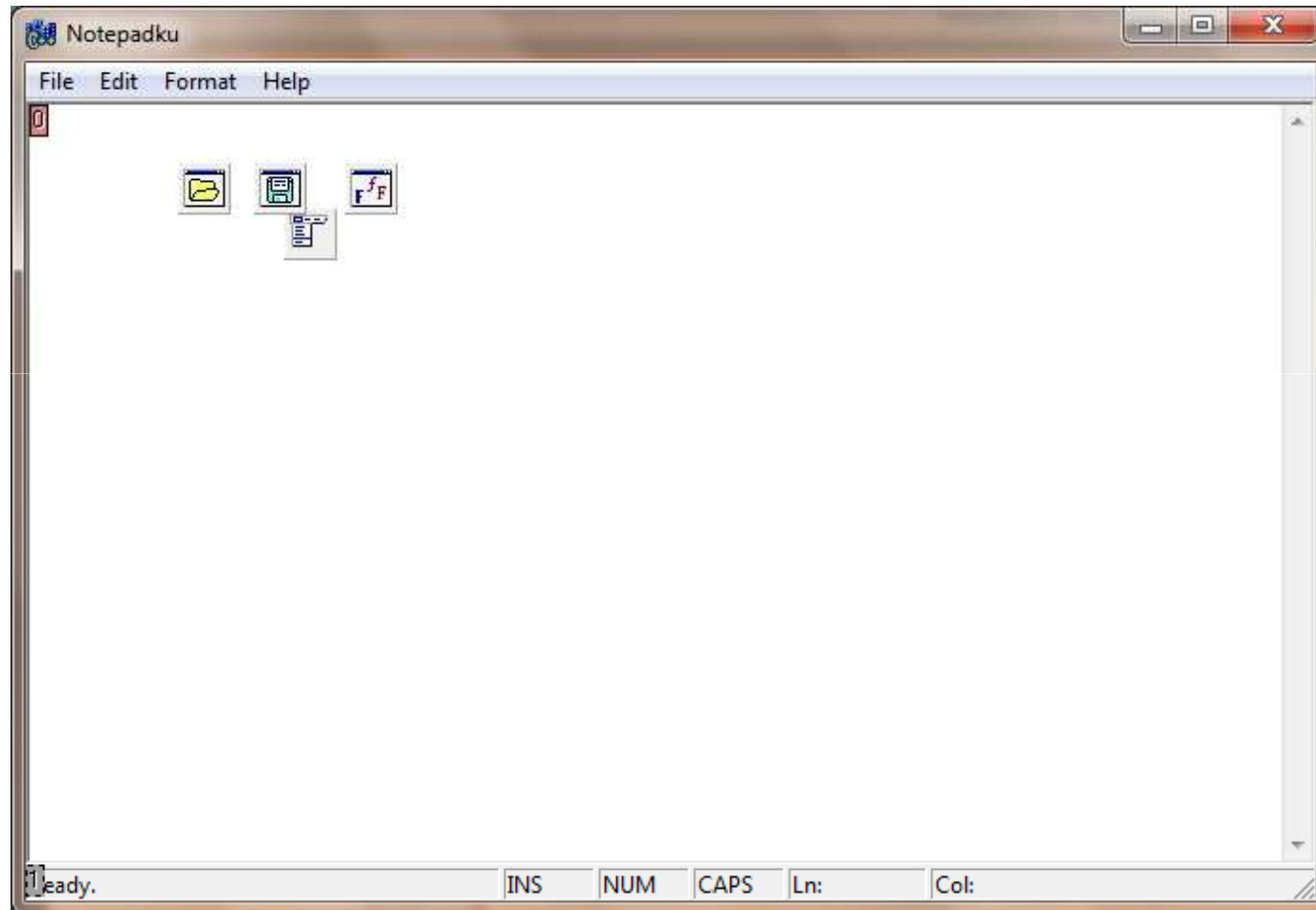
Menu dan Dialog
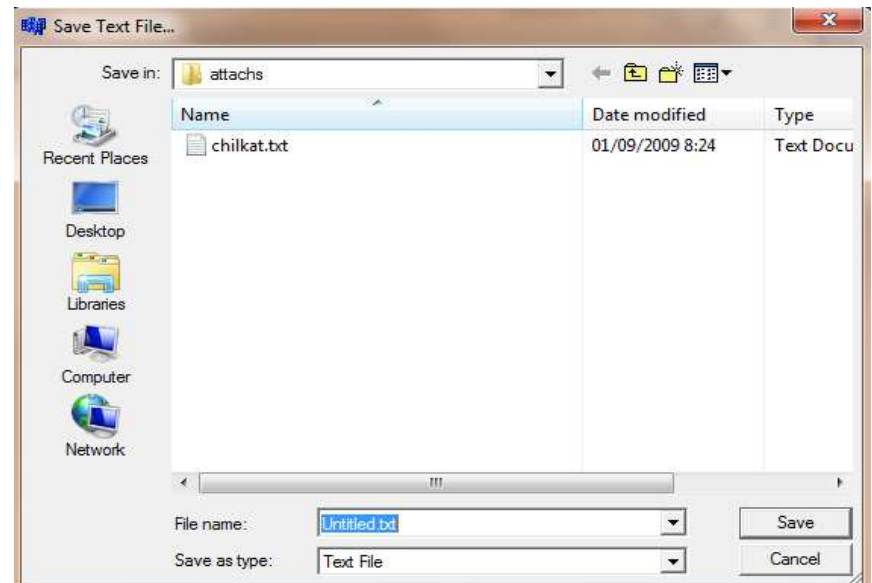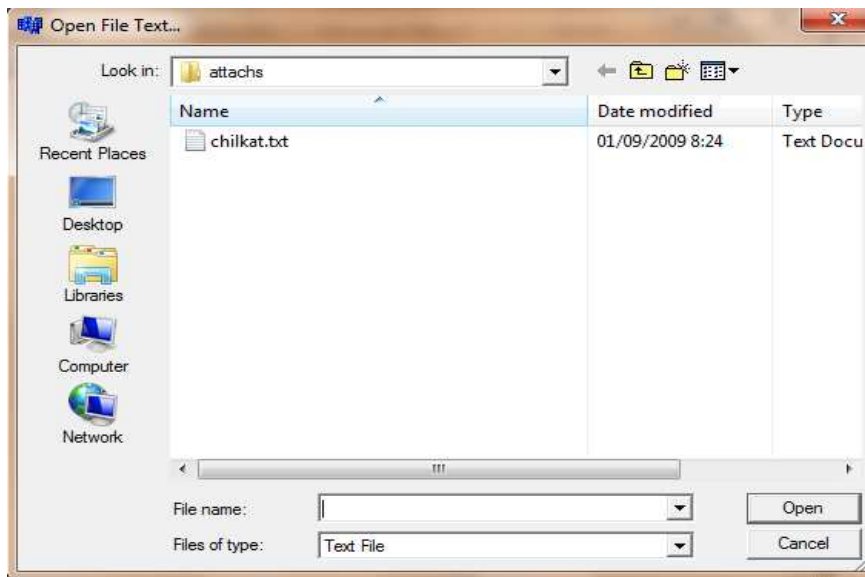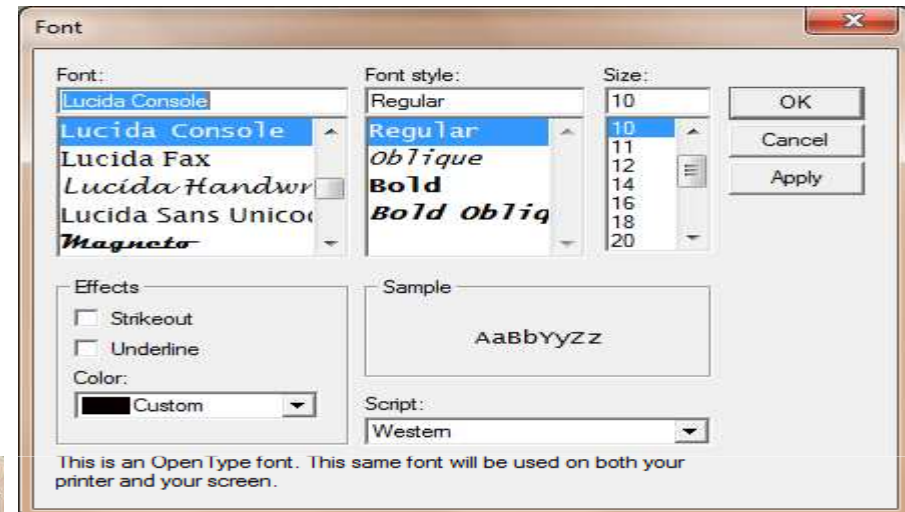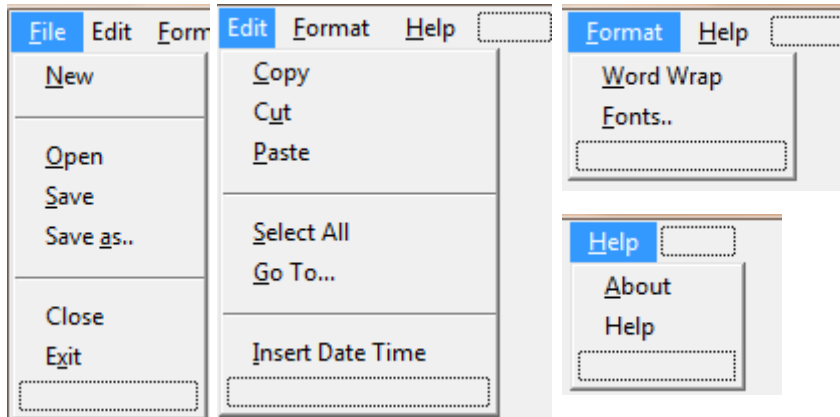
ScreenShots
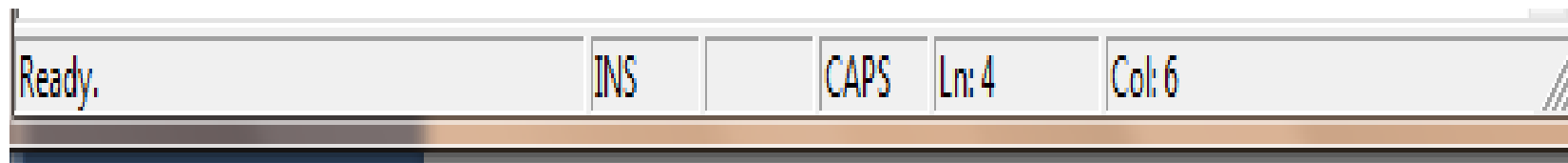
The End

- Thanks for being my great students!
  - See you on another subjects! ☺
  - Happy Coding! Exercise n Practice make prefect!
- TAS:
  - Open books
  - Soal pilihan ganda dan Essay
  - Bahan dari awal – akhir!
- *Barangsiapa menabur dengan penuh air mata akan menuai dengan bersorak-sorai!*