The exam is open book and open notes. You may use your course text book and your notes and handouts for this class.

Problem 1 (4 points). Are the following valid Windows file names?
$\qquad$ Yes __X_No "Who is there?"
Why or why not? You can not use "?" in a file name.
$\qquad$ Yes $\qquad$ No "FOUR STAR HOTEL ****"
Why or why not? You can not use "**" in a file name.
Problem 2 (2 points). Is "C:\SaleslNew York" a Windows file name or a path name?
$\qquad$ File name $\qquad$ X Path name

Problem 3 ( 2 points). Describe the contents of the text box after the command button has been clicked:


Problem 4 (4 points). Write one or two lines of VB code to carry out the task:
a. Display "E.T. phone home." in a text box Text1.
Text1.Text = "E.T. phone home."
b. Display "Hello" in red letters in text box Text1.

```
Text1.ForeColor = vbRed
Text1.Text = "Hello"
```

Problem 5 (4 points). Evaluate the following numeric expressions:
a. $1 /\left(2^{\wedge} 5\right)=\_1 / 32=\mathbf{0 . 0 3 1 2 5}$
b. $\left.3^{*}(-2)^{\wedge} 5\right)={ }_{-} \mathbf{3}^{*} \mathbf{2}^{\wedge} 5=-3 * 32=\mathbf{- 9 6}$

Problem 6 (10 points). Are the following names valid Visual Basic variable names?
Name
a. ___ Yes _X_No. sales. 2003
b. _X_Yes ___ No. fOrM_1040
c. __ Yes _X_No. expenses?
d. ___ Yes _X_No. room\&board
e.__Yes _X_No. 1040B

Problem 7 (10 points). Evaluate the following numeric expressions where $\mathrm{a}=2, \mathrm{~b}=3$, and $\mathrm{c}=$ 4
a. $(a * b)+c \quad$ Value: $\qquad$
b. $(1+b)$ c Value: $\qquad$
c. $b^{\wedge}(c-a) \quad$ Value: $\qquad$ 9
d. $a *(b+c) \quad$ Value: $\qquad$ 14 $\qquad$
e. $(c-a)^{\wedge} b \quad$ Value: $\qquad$
$\qquad$
Problem 8 (2 points). Write an event procedure [ Private Sub Command1_Click()] to calculate and display the value of the following expression in a picture box named "Pic1"

```
    Expression = 15-3(2+34)
Private Sub Command1_Click()
```

    Expression \(=15-3 *\left(2+3{ }^{\wedge} 4\right)\)
    Pic1.Print Expression
    End Sub

Problem 9 (8 points). Complete the following table by filling in the value of each variable after each line is executed

| Private Sub Command_Click() | $\mathbf{x}$ | $\mathbf{y}$ |
| :---: | :---: | :---: |
| $\mathrm{x}=2$ | $\mathbf{2}$ |  |
| $\mathrm{y}=3 \times \mathrm{x}$ |  | $\mathbf{6}$ |
| $\mathrm{x}=\mathrm{y}+\mathrm{5}$ | $\mathbf{1 1}$ |  |
| Picture1.Cls |  |  |
| Picture1.Print $\mathrm{x}+4$ | $\mathbf{1 1}$ | $\mathbf{6}$ |
| $\mathrm{y}=\mathrm{y}+\mathrm{1}$ |  | $\mathbf{7}$ |
| End Sub |  |  |

Problem 10 (10 points). Complete the following table by filling in the value of each variable after each line is executed

| Private Sub Command_Click() | bal | inter | withDr |
| :---: | :--- | :--- | :--- |
| bal $=100$ | $\mathbf{1 0 0}$ |  |  |
| inter $=0.05$ | $\mathbf{1 0 0}$ | $\mathbf{0 . 0 5}$ |  |
| withDr $=25$ | $\mathbf{1 0 0}$ | $\mathbf{0 . 0 5}$ | $\mathbf{2 5}$ |
| bal $=$ bal + inter * bal | $\mathbf{1 0 5}$ | $\mathbf{0 . 0 5}$ | $\mathbf{2 5}$ |
| bal $=$ bal - withDr | $\mathbf{8 0}$ | $\mathbf{0 . 0 5}$ | $\mathbf{2 5}$ |
| End Sub |  |  |  |

Problem 11 (8 points). Determine the output displayed in the picture box by the following lines of code
a. amount $=10$

Picture1.Print amount - 4
Output: $\qquad$ 6
b. number $=5$
number = 2 * number
Picture1.Print number
Output: $\qquad$ 10 $\qquad$
c. $\mathrm{x}=3$

Picture1.Print x ^ x ; $\mathrm{x}+3$ * x
Output: $\qquad$
d. $\mathrm{n}=2$

Picture1.Print 3 * $n$
$\mathrm{n}=\mathrm{n}+\mathrm{n}$
Picture1.Print n + n
Output: $\qquad$ 6
Output: $\qquad$ 8 $\qquad$
Problem 12 (4 points). Write an event procedure [ Private Sub Command1_Click() ... End Sub], and having one line for each of the following steps (a) - (c). Lines that display data should use the given variable names. The following steps calculate the balance in an account after 10 years when $\$ 100$ is deposited in a savings account at $5 \%$ interest compounded annually.
(a) Assign the value 100 to the variable balance.
(b) Multiply the variable balance by 1.05 raised to the $9^{\text {th }}$ power.
(c) Display the value of the variable balance in a picture box named "Pic1"

```
Private Sub Command1_Click()
    Balance = 100
    Balance = Balance * (1.05 ^ 9)
    Pic1.Print Balance
```

End Sub

Problem 13 (4 points). Suppose a ball is thrown straight up in the air with an initial velocity of 50 feet per second and an initial height of 5 feet. How high will the ball be after 3 seconds? (Note: The height after $t$ seconds is given by the expression $h=-16 t^{2}+v_{0} t+h_{0}$.) Write an event procedure [Private Sub Command1_Click() ... End Sub] to solve the problem and display the answer in a picture box named "Pic 1".

```
Private Sub Command1_Click()
    \(T=3\)
    \(\mathrm{VO}=50\)
    HO \(=5\)
    H = -16 * T * T + VO * T + Ho
    Pic1.Print H
```

End Sub

Problem 14 (4 points). Assume that the file DATA.TXT (shown to the right of the code) has been opened for input with reference number 1. Determine the output displayed in the picture box by the lines of code.

```
Dim num As Integer, strng As String DATA.TXT
Input #1, num, strng
4, "calling birds"
Picture1.Print num; strng 3, "French hens"
Close #1
Open "DATA.TXT" For Input As #1
Input #1, num, strng
Picture1.Print num; strng
```

Output: 4 calling birds
4 calling birds
Problem 15 (8 points). Determine if the following conditions are true or false. Assume $\mathrm{a}=2$ and $b=3$

## Condition

a. _X_True ___ False $\mathrm{a}^{\wedge}(5-2)>7$
b. _X_True ___ False $(\mathrm{a}<\mathrm{b})$ Or $(\mathrm{b}<\mathrm{a})$
c. __ True _F_False $\operatorname{Not}((a<b)$ And $(a<(b+a))$
d. _T_True ___ False $\quad((a=b) \operatorname{Or} \operatorname{Not}(b<a)) \operatorname{And}((a<b) \operatorname{Or}(b=a+1))$

Problem 16 (2 points). Determine the output displayed in the picture box when the command button is clicked.

```
Private Sub Command1_Click()
    Dim a As Single, b As Single, c As Single
    a = 2
    b}=
    c = 5
    If a * b < c Then
            b}=
    Else
            b = c * a
    End if
    Picture1.Print b
End Sub
```

Value Displayed: $\qquad$ 10 $\qquad$

Problem 17 (14 points). The following flowchart finds the greatest common divisor (the largest integer that divides both) of the two positive integers input by the user. Write a Visual Basic program that corresponds to the flowchart.

| Start | Private Sub Command1_Click() <br> $\operatorname{Dim} M$ As Integer, N As Integer, T |
| :---: | :---: |
| $\begin{gathered} \text { Get 2 } \\ \text { Pos. integers } \\ M \text { and } N \end{gathered}$ | As Integer |
|  | $\mathrm{M}=$ Text1.Text |
| is | N = Text2.Text |
| N*0 | Do While N <> 0 |
| $\text { yes } \zeta$ | $\mathbf{T}=\mathbf{N}$ |
| $\begin{gathered} \text { Set } \\ T=\mathrm{N} \\ \hline \end{gathered}$ | $\mathbf{N}=\mathbf{M} \operatorname{Mod} \mathbf{N}$ |
|  | $\mathbf{M}=\mathbf{T}$ |
| $\frac{\mathrm{N}=\mathrm{M} \bmod \mathrm{~N}}{\downarrow}$ | Loop |
| $\begin{gathered} \text { Set } \\ M=T \end{gathered}$ | Picture1.Print M |
|  | End Sub |
| $\stackrel{\square}{\square}$ |  |
|  |  |
| $\square$ |  |
| End |  |

