UTS Program Design Method

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1. [LO 1 & LO 2, 10 poin] Buatkan tabel IPO chart!

IPO CHART

Input	Process	Output
deposito	Declare tenor, tahun, i, and rep as integer	rep
tenor	Declare deposito, bunga, bungaPerTahun, totalDep, totalBunga, interestExp, incomeTax, and netInvest as double	bungaPerTahun
tahun	Input deposito, validate the input must between USD $100 – USD $10000	totalDep
	Input tenor, validate the input can only be 1/3/6/12	bunga
	Input tahun, validate the input must between 1 – 10	totalBunga
	Set rep = (12 / tenor) * tahun	interestExp
	Set bunga = 0	incomeTax
	Set totalDep = deposito	netInvest
	Set i = 1	
	Check if tenor = 1, Set bungaPerTahun = 0.034, else if tenor = 3, Set bungaPerTahun = 0.036, else if tenor = 6, Set bungaPerTahun = 0.0375, else if tenor = 12, Set bungaPerTahun = 0.042	
	While rep is greater than 0, repeat this process : - Set bunga = totalDep * ((bungaPerTahun/12) * tenor) - Set totalDep = totalDep + bunga - Display i, (totalDep-bunga), bungaPerTahun, tenor, bunga, totalDep, (totalDep – deposito) - Set i = i + 1 - Set rep = rep – 1	
	Set totalBunga = totalDep – deposito	
	Display totalBunga	
	Set interestExp = 0.01 * totalBunga	
	Display interestExp	
	Set incomeTax = 0	
	Check if deposito >= 1000, Set incomeTax = 0.2 * totalBunga	
	Display incomeTax	
	Set netInvest = deposito + totalBunga - (interestExp + incomeTax)	
	Display netInvest	

2. [LO 1 & LO 2, 35 poin] Buatkan desain Pseudocode!

PSEUDOCODE

```
1.  Function Real getDeposito()
2.  Declare Real deposito
3.  Do
4.      Set system("cls")
5.      Display "======================"
6.      Display "| KALKULATOR DEPOSITO |"
7.      Display "======================"
8.      Display "< DEPOSITO >"
9.      Display "Jumlah Deposito Awal yang dimasukkan harus diantara USD
        $100 - USD $10000"
10.     Display "Jika Jumlah Deposito Awal senilai USD $1000 atau
        diatasnya, maka akan dikenakan pajak sebesar 20% dari total bunga"
11.     Display " Silakan Masukkan Jumlah Deposito Awal [USD $100 - USD
        $10000] : "
12.     Input deposito
13.     Set getchar()
14.     If deposito < 100 OR deposito > 10000 Then
15.         Display "Input yang Anda Masukkan Tidak Valid!"
16.         Display "Jumlah Deposito Awal yang dimasukkan harus
        diantara USD $100 - USD $10000"
17.         Display "Silakan Input Ulang Jumlah Deposito Awal Anda"
18.         Display "Press Enter to Continue..."
19.         Set getchar()
20.     End If
21. While deposito < 100 OR deposito > 10000
22.
23. Display "Jumlah Deposito Awal Senilai USD $", deposito, " Telah Sukses
    Diinput!"
24. Display "Press Enter to Continue..."
25. Set getchar()
26. Set return deposito
27. End Function
28.
29. Function Integer getTenor()
30. Declare Integer tenor
31. Do
32.     Set system("cls")
33.     Display "======================"
34.     Display "| KALKULATOR DEPOSITO |"
35.     Display "======================"
36.     Display "< TENOR >"
37.     Display "Pilihan Tenor yang Tersedia :"
38.     Display "- 1 Bulan dengan bunga per tahun sebesar 3.4%"
39.     Display "- 3 Bulan dengan bunga per tahun sebesar 3.6%"
40.     Display "- 6 Bulan dengan bunga per tahun sebesar 3.75%"
41.     Display "- 12 Bulan dengan bunga per tahun sebesar 4.2%"
```

```
42.             Display “Tenor yang dimasukkan harus yang terdapat pada pilihan tenor yang tersedia yaitu diantara 1, 3, 6, atau 12”
43.             Display “Silakan Masukkan Pilihan Tenor yang Tersedia [1/3/6/12 Bulan] : “
44.             Input tenor
45.             Set getchar()
46.             If tenor NOT= 1 AND tenor NOT= 3 AND tenor NOT= 6 AND tenor NOT= 12 Then
47.                 Display “Input yang Anda Masukkan Tidak Valid!”
48.                 Display “Tenor yang dimasukkan harus yang terdapat pada pilihan tenor yang tersedia yaitu diantara 1, 3, 6, atau 12”
49.                 Display “Silakan Input Ulang Pilihan Tenor Anda”
50.                 Display “Press Enter to Continue...”
51.                 Set getchar()
52.             End If
53.         While tenor NOT= 1 AND tenor NOT= 3 AND tenor NOT= 6 AND tenor NOT= 12
54.
55.         Display “Pilihan Tenor ”, tenor, “ Bulan Telah Sukses Diinput!”
56.         Display “Press Enter to Continue...”
57.         Set getchar()
58.         Set return tenor
59.         End Function
60.
61.         Function Integer getYear()
62.         Declare Integer tahun
63.         Do
64.             Set system(“cls”)
65.             Display “=======================”
66.             Display “| KALKULATOR DEPOSITO |”
67.             Display “=======================”
68.             Display “< TAHUN >”
69.             Display “Jumlah Tahun yang dimasukkan harus diantara angka 1 sampai 10”
70.             Display “Silakan Masukkan Durasi Tahun [1-10 Tahun] : “
71.             Input tahun
72.             Set getchar()
73.             If tahun < 1 OR tahun > 10 Then
74.                 Display “Input yang Anda Masukkan Tidak Valid!”
75.                 Display “Durasi Tahun yang dimasukkan harus diantara angka 1 sampai 10”
76.                 Display “Silakan Input Ulang Durasi Tahun Anda”
77.                 Display “Press Enter to Continue...”
78.                 Set getchar()
79.             End If
80.         While tahun < 1 OR tahun > 10
81.
82.         Display “Durasi selama “, tahun, “ Tahun Telah Sukses Diinput!”
83.         Display “Press Enter to Continue…”
84.         Set getchar()
```

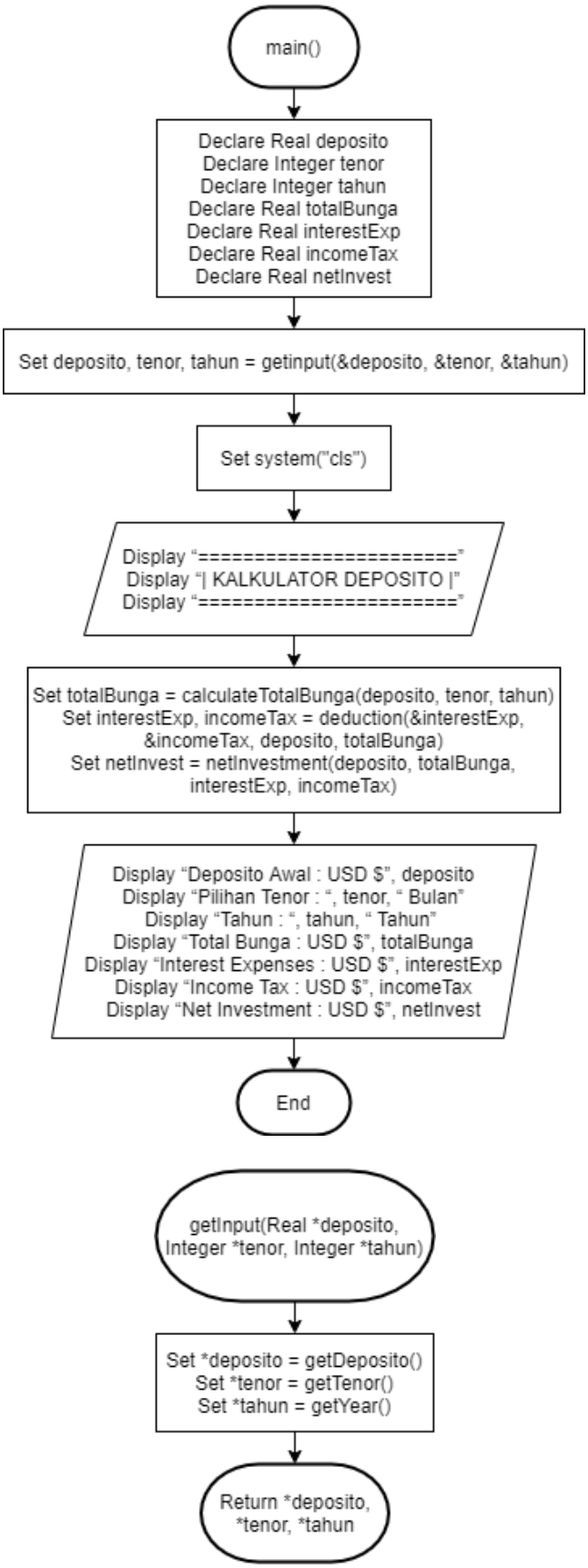
```
85.         Set return tahun
86.         End Function
87.
88.         Function Real getinput(Real *deposito, Integer *tenor, Integer *tahun)
89.         Set *deposito = getDeposito()
90.         Set *tenor = getTenor()
91.         Set *tahun = getYear()
92.         Set return *deposito, *tenor, *tahun
93.         End Function
94.
95.         Function Real calculateTotalBunga(Real deposito, Integer tenor, Integer
    tahun)
96.         Declare Integer rep
97.         Declare Real bunga
98.         Declare Real bungaPerTahun
99.         Declare Real totalDep
100.        Declare Real totalBunga
101.        Declare Integer i
102.
103.        Set rep = (12/tenor) * tahun
104.        Set bunga = 0
105.        Set totalDep = deposito
106.        Set i = 1
107.
108.        If tenor == 1 Then
109.                bungaPerTahun = 0.034
110.        Else If tenor == 3 Then
111.                bungaPerTahun = 0.036
112.        Else If tenor == 6 Then
113.                bungaPerTahun = 0.0375
114.        Else If tenor == 12 Then
115.                bungaPerTahun = 0.042
116.        End If
117.
118.        Display
    "============================================================
    ========================================="
119.        Display " | Repetition |   Deposito   | Bunga per Tahun | Pilihan Tenor |  Bunga
    | Deposito Total | Total Bunga |"
120.
121.        While rep > 0
122.                Set bunga = totalDep * ((bungaPerTahun/12) * tenor)
123.                Set totalDep = totalDep + bunga
124.                Display
    "============================================================
    ========================================="
125.                Display "| ", i, " | ", totalDep-bunga, " | ", bungaPerTahun, " | ", tenor,
    " | ", bunga, " | ", totalDep, " | ", totalDep-deposito, " |"
126.                Set i = i + 1
127.                Set rep = rep – 1
```

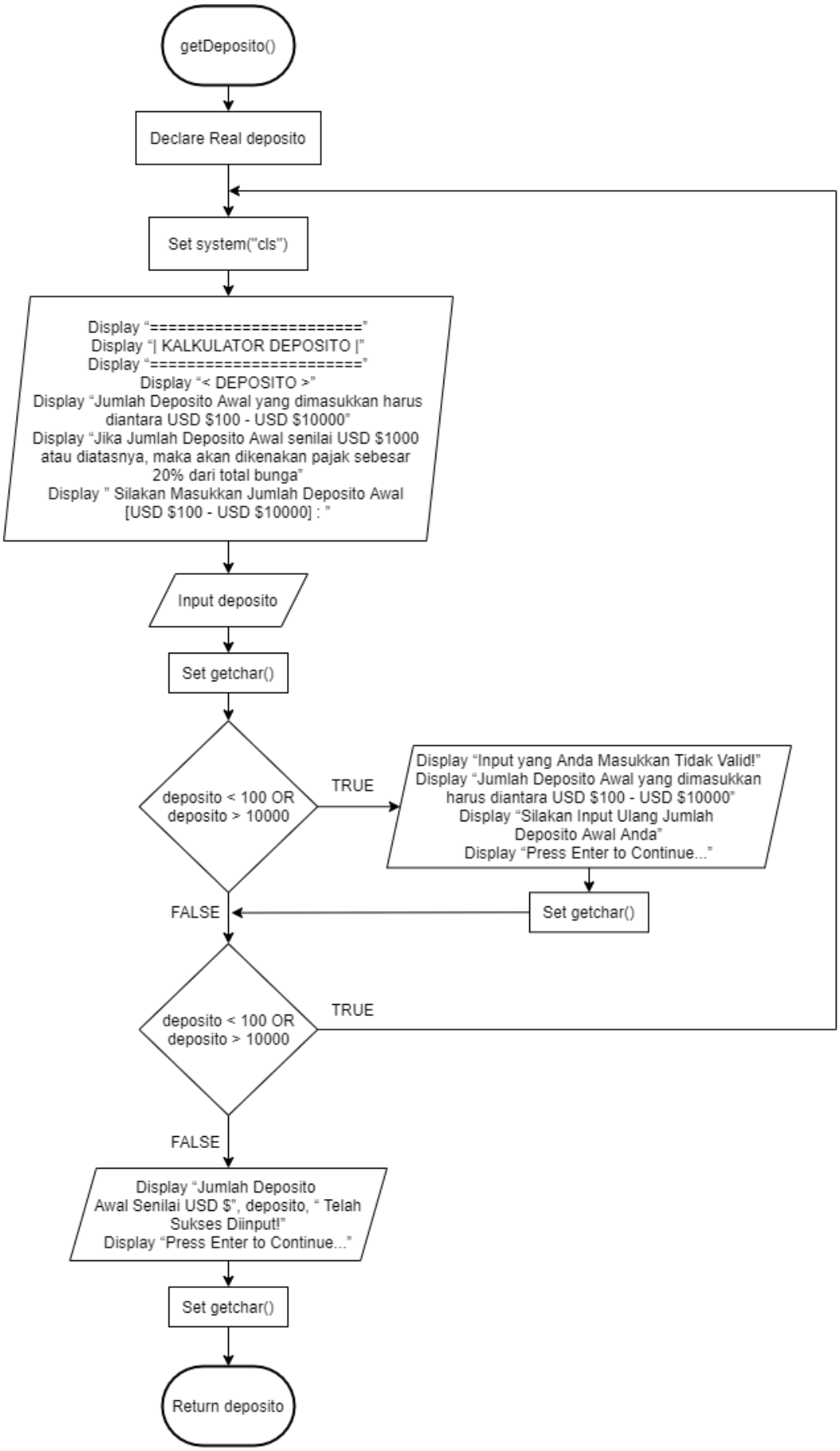
```
128.        End While
129.        Display
    "==========================================================
    ========================================="
130.
131.        Set totalBunga = totalDep – deposito
132.        Set return totalBunga
133.        End Function
134.
135.
136.        Function Real getInterestExpenses(Real totalBunga)
137.        Declare Real interestExp
138.        Set interestExp = 0.01 * totalBunga
139.        Set return interestExp
140.        End Function
141.
142.        Function Real getIncomeTax(Real deposito, Real totalBunga)
143.        Declare Real incomeTax
144.        Set incomeTax = 0
145.        If deposito >= 1000 Then
146.                Set incomeTax = 0.2 * totalBunga
147.        End If
148.        Set return incomeTax
149.        End Function
150.
151.        Function Real deduction(Real *interestExp, Real *incomeTax, Real deposito,
    Real totalBunga)
152.        Set *interestExp = getInterestExpenses(totalBunga)
153.        Set *incomeTax = getIncomeTax(deposito, totalBunga)
154.        Set return *interestExp, *incomeTax
155.        End Function
156.
157.        Function Real netInvestment(Real deposito, Real totalBunga, Real
    interestExp, Real incomeTax)
158.        Declare Real netInvest
159.        Set netInvest = deposito + totalBunga - (interestExp + incomeTax)
160.        Set return netInvest
161.        End Function
162.
163.        Function Integer main()
164.        Declare Real deposito
165.        Declare Integer tenor
166.        Declare Integer tahun
167.        Declare Real totalBunga
168.        Declare Real interestExp
169.        Declare Real incomeTax
170.        Declare Real netInvest
171.
172.        Set deposito, tenor, tahun = getinput(&deposito, &tenor, &tahun)
173.
```

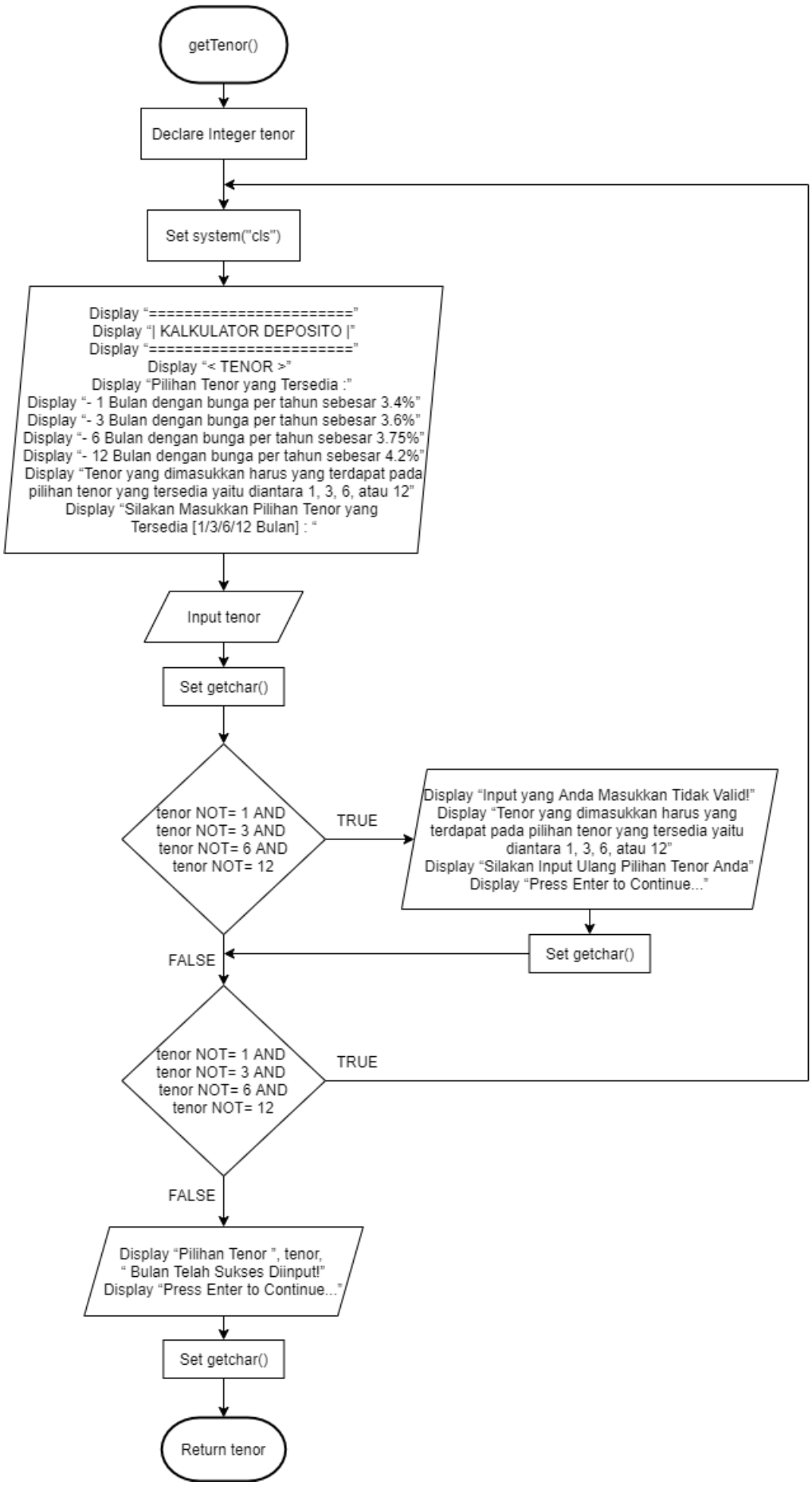
```
174.    Set system("cls")
175.    Display "======================"
176.    Display "| KALKULATOR DEPOSITO |"
177.    Display "======================"
178.
179.    Set totalBunga = calculateTotalBunga(deposito, tenor, tahun)
180.    Set interestExp, incomeTax = deduction(&interestExp, &incomeTax,
    deposito, totalBunga)
181.    Set netInvest = netInvestment(deposito, totalBunga, interestExp, incomeTax)
182.
183.    Display "Deposito Awal : USD $", deposito
184.    Display "Pilihan Tenor : ", tenor, " Bulan"
185.    Display "Durasi Tahun : ", tahun, " Tahun"
186.    Display "Total Bunga : USD $", totalBunga
187.    Display "Interest Expenses : USD $", interestExp
188.    Display "Income Tax : USD $", incomeTax
189.    Display "Net Investment : USD $", netInvest
190.
191.    Set return 0
192.    End Function
```

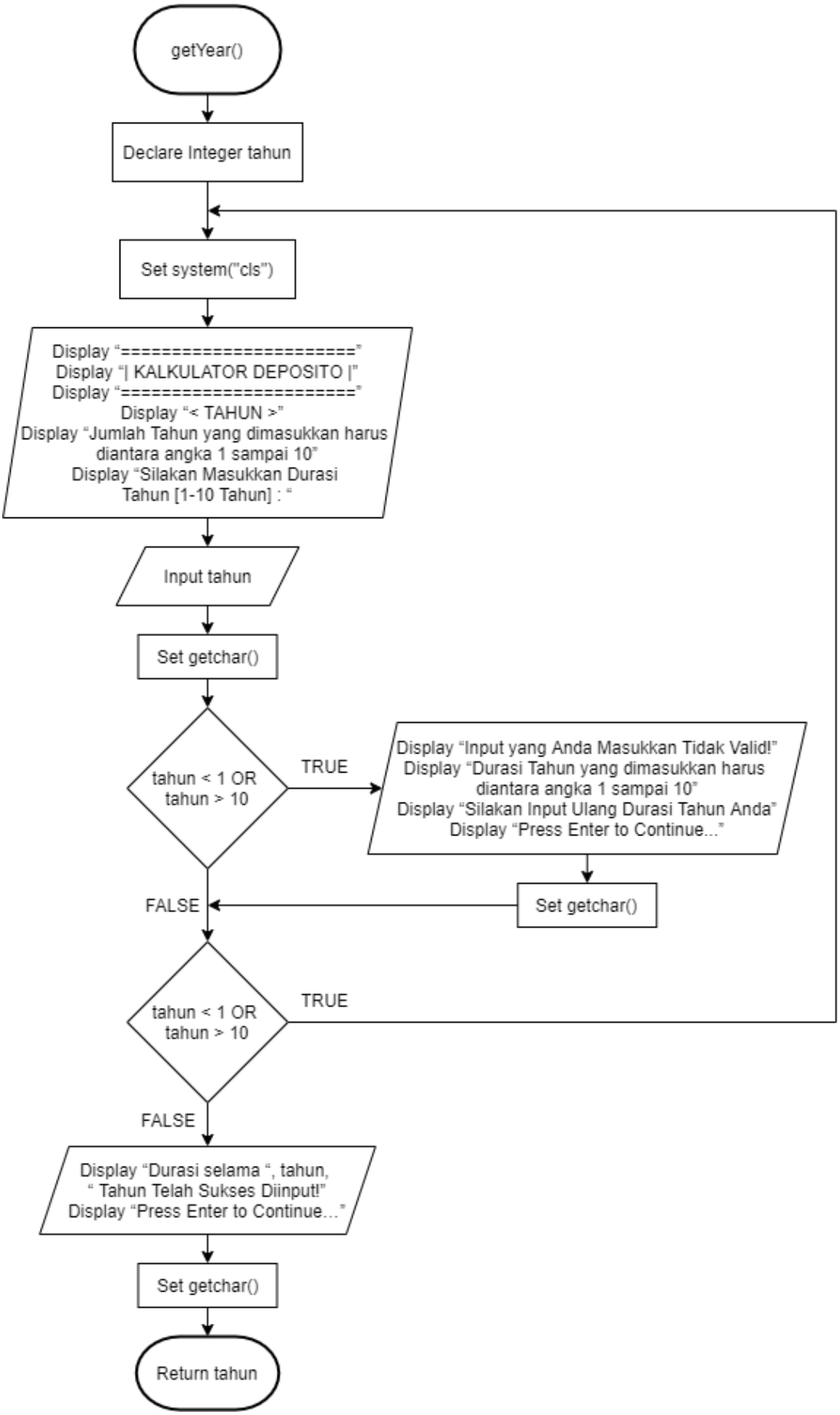
3. [LO 1 & LO 2, 25 poin] Buatkan desain Flow chart!

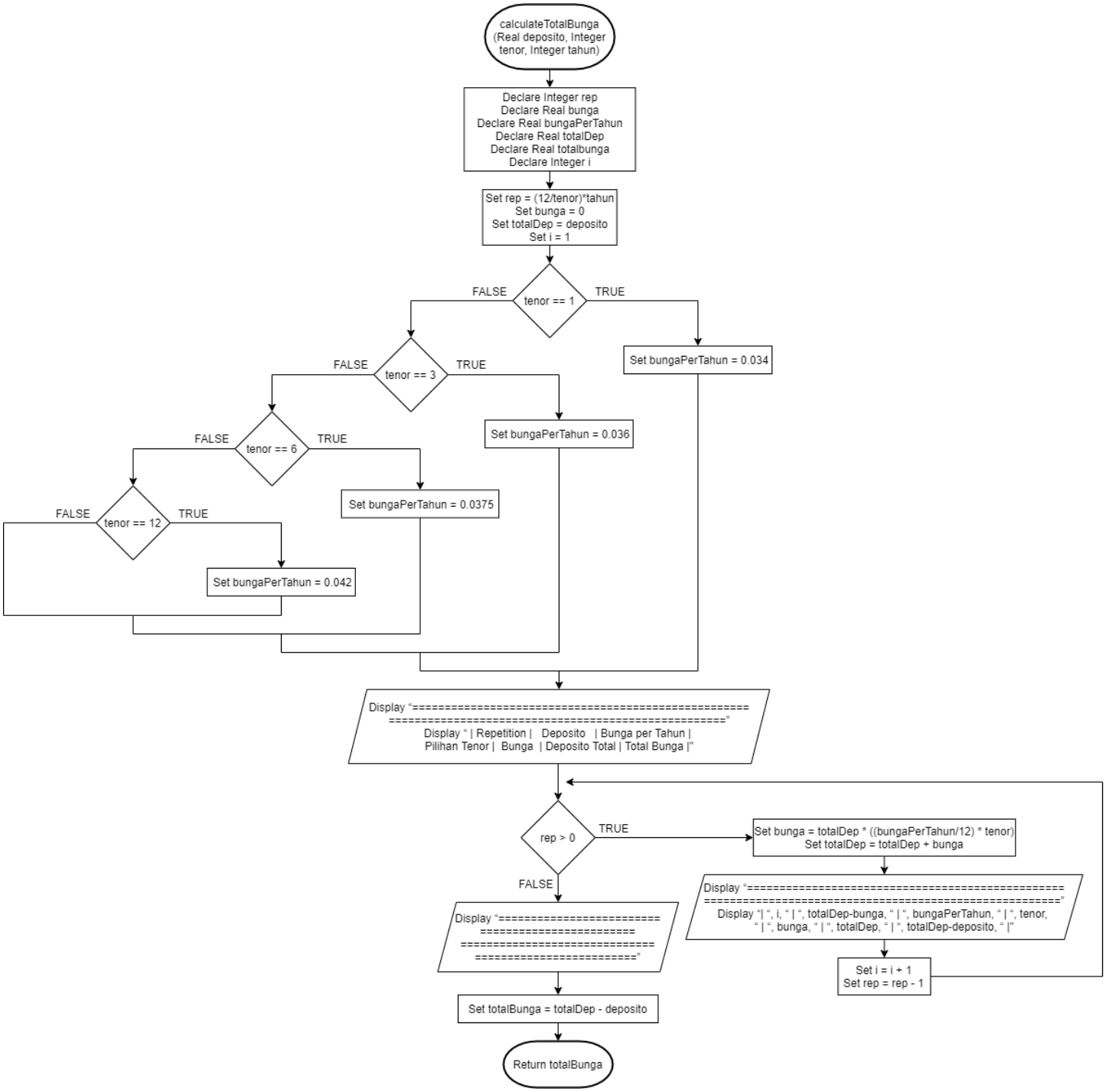
FLOWCHART

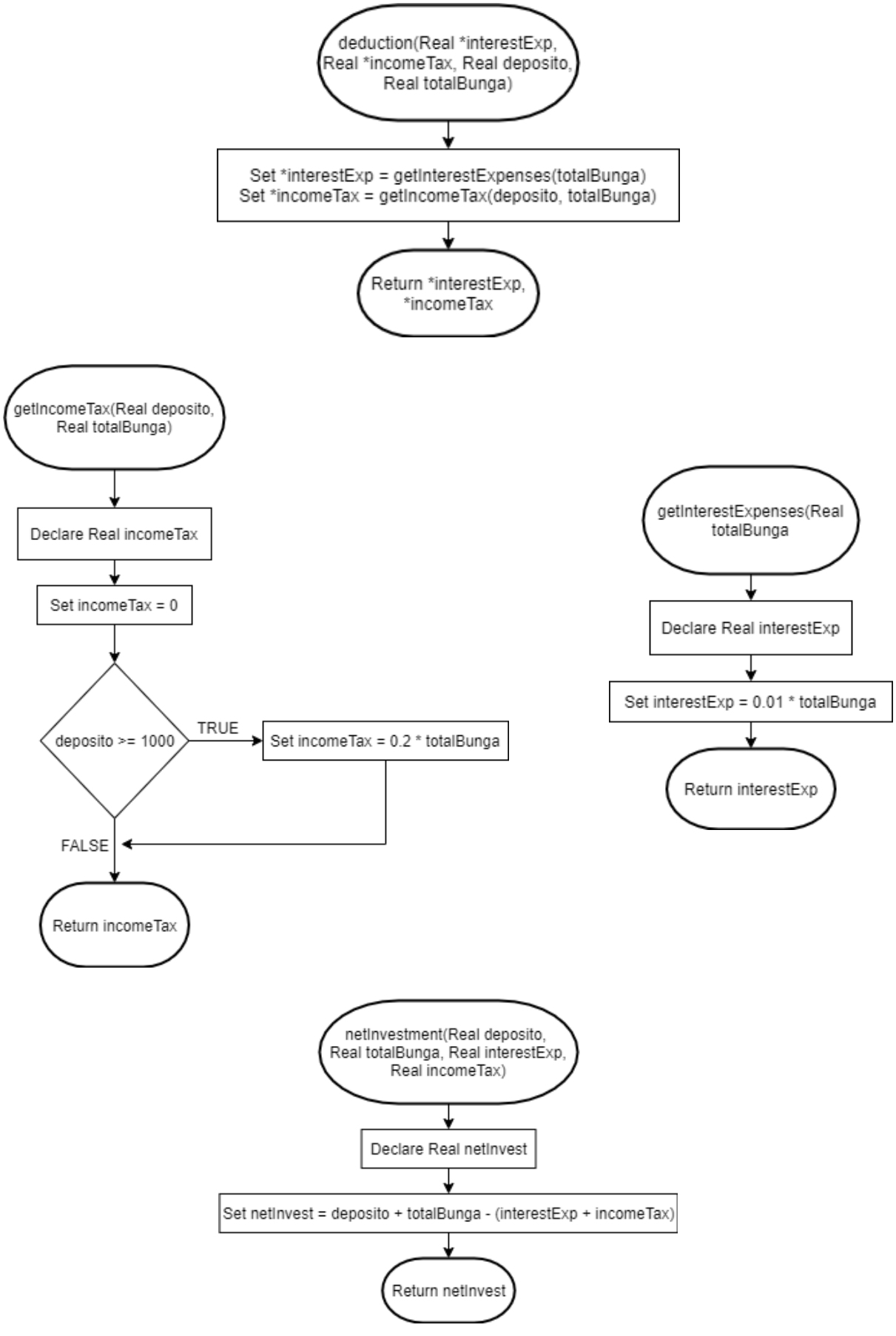



getDeposito()
Declare Real deposito
Set system("cls")
Display "========================"
Display "| KALKULATOR DEPOSITO |"
Display "========================"
Display "< DEPOSITO >"
Display "Jumlah Deposito Awal yang dimasukkan harus diantara USD $100 - USD $10000"
Display "Jika Jumlah Deposito Awal senilai USD $1000 atau diatasnya, maka akan dikenakan pajak sebesar 20% dari total bunga"
Display " Silakan Masukkan Jumlah Deposito Awal [USD $100 - USD $10000] : "
Input deposito
Set getchar()
deposito < 100 OR deposito > 10000
TRUE
Display "Input yang Anda Masukkan Tidak Valid!"
Display "Jumlah Deposito Awal yang dimasukkan harus diantara USD $100 - USD $10000"
Display "Silakan Input Ulang Jumlah Deposito Awal Anda"
Display "Press Enter to Continue..."
Set getchar()
FALSE
deposito < 100 OR deposito > 10000
TRUE
FALSE
Display "Jumlah Deposito Awal Senilai USD $", deposito, " Telah Sukses Diinput!"
Display "Press Enter to Continue..."
Set getchar()
Return deposito


getTenor()
Declare Integer tenor
Set system("cls")
Display "========================"
Display "| KALKULATOR DEPOSITO |"
Display "========================"
Display "< TENOR >"
Display "Pilihan Tenor yang Tersedia :"
Display "- 1 Bulan dengan bunga per tahun sebesar 3.4%"
Display "- 3 Bulan dengan bunga per tahun sebesar 3.6%"
Display "- 6 Bulan dengan bunga per tahun sebesar 3.75%"
Display "- 12 Bulan dengan bunga per tahun sebesar 4.2%"
Display "Tenor yang dimasukkan harus yang terdapat pada pilihan tenor yang tersedia yaitu diantara 1, 3, 6, atau 12"
Display "Silakan Masukkan Pilihan Tenor yang Tersedia [1/3/6/12 Bulan] : "
Input tenor
Set getchar()
tenor NOT= 1 AND tenor NOT= 3 AND tenor NOT= 6 AND tenor NOT= 12
TRUE
Display "Input yang Anda Masukkan Tidak Valid!"
Display "Tenor yang dimasukkan harus yang terdapat pada pilihan tenor yang tersedia yaitu diantara 1, 3, 6, atau 12"
Display "Silakan Input Ulang Pilihan Tenor Anda"
Display "Press Enter to Continue..."
Set getchar()
FALSE
tenor NOT= 1 AND tenor NOT= 3 AND tenor NOT= 6 AND tenor NOT= 12
TRUE
FALSE
Display "Pilihan Tenor ", tenor, " Bulan Telah Sukses Diinput!"
Display "Press Enter to Continue..."
Set getchar()
Return tenor


getYear()
Declare Integer tahun
Set system("cls")
Display "========================"
Display "| KALKULATOR DEPOSITO |"
Display "========================"
Display "< TAHUN >"
Display "Jumlah Tahun yang dimasukkan harus diantara angka 1 sampai 10"
Display "Silakan Masukkan Durasi Tahun [1-10 Tahun] : "
Input tahun
Set getchar()
tahun < 1 OR tahun > 10
TRUE
Display "Input yang Anda Masukkan Tidak Valid!"
Display "Durasi Tahun yang dimasukkan harus diantara angka 1 sampai 10"
Display "Silakan Input Ulang Durasi Tahun Anda"
Display "Press Enter to Continue..."
Set getchar()
FALSE
tahun < 1 OR tahun > 10
TRUE
FALSE
Display "Durasi selama ", tahun, " Tahun Telah Sukses Diinput!"
Display "Press Enter to Continue..."
Set getchar()
Return tahun


calculateTotalBunga (Real deposito, Integer tenor, Integer tahun)
Declare Integer rep
Declare Real bunga
Declare Real bungaPerTahun
Declare Real totalDep
Declare Real totalbunga
Declare Integer i
Set rep = (12/tenor)*tahun
Set bunga = 0
Set totalDep = deposito
Set i = 1
tenor == 1
FALSE
TRUE
Set bungaPerTahun = 0.034
tenor == 3
FALSE
TRUE
Set bungaPerTahun = 0.036
tenor == 6
FALSE
TRUE
Set bungaPerTahun = 0.0375
tenor == 12
FALSE
TRUE
Set bungaPerTahun = 0.042
Display "==========
==========
Display " | Repetition | Deposito | Bunga per Tahun |
Pilihan Tenor | Bunga | Deposito Total | Total Bunga |"
rep > 0
TRUE
Set bunga = totalDep * ((bungaPerTahun/12) * tenor)
Set totalDep = totalDep + bunga
Display "==========
==========
Display "| ", i, " | ", totalDep-bunga, " | ", bungaPerTahun, " | ", tenor,
" | ", bunga, " | ", totalDep, " | ", totalDep-deposito, " |"
Set i = i + 1
Set rep = rep - 1
FALSE
Display "==========
==========
==========
==========
Set totalBunga = totalDep - deposito
Return totalBunga


deduction(Real *interestExp, Real *incomeTax, Real deposito, Real totalBunga)
Set *interestExp = getInterestExpenses(totalBunga)
Set *incomeTax = getIncomeTax(deposito, totalBunga)
Return *interestExp, *incomeTax
getIncomeTax(Real deposito, Real totalBunga)
Declare Real incomeTax
Set incomeTax = 0
deposito >= 1000
TRUE
Set incomeTax = 0.2 * totalBunga
FALSE
Return incomeTax
getInterestExpenses(Real totalBunga
Declare Real interestExp
Set interestExp = 0.01 * totalBunga
Return interestExp
netInvestment(Real deposito, Real totalBunga, Real interestExp, Real incomeTax)
Declare Real netInvest
Set netInvest = deposito + totalBunga - (interestExp + incomeTax)
Return netInvest

4. [LO 1 & LO 2, 10 poin] Buatkan Hand tracing minimal 2x inputan berbeda!

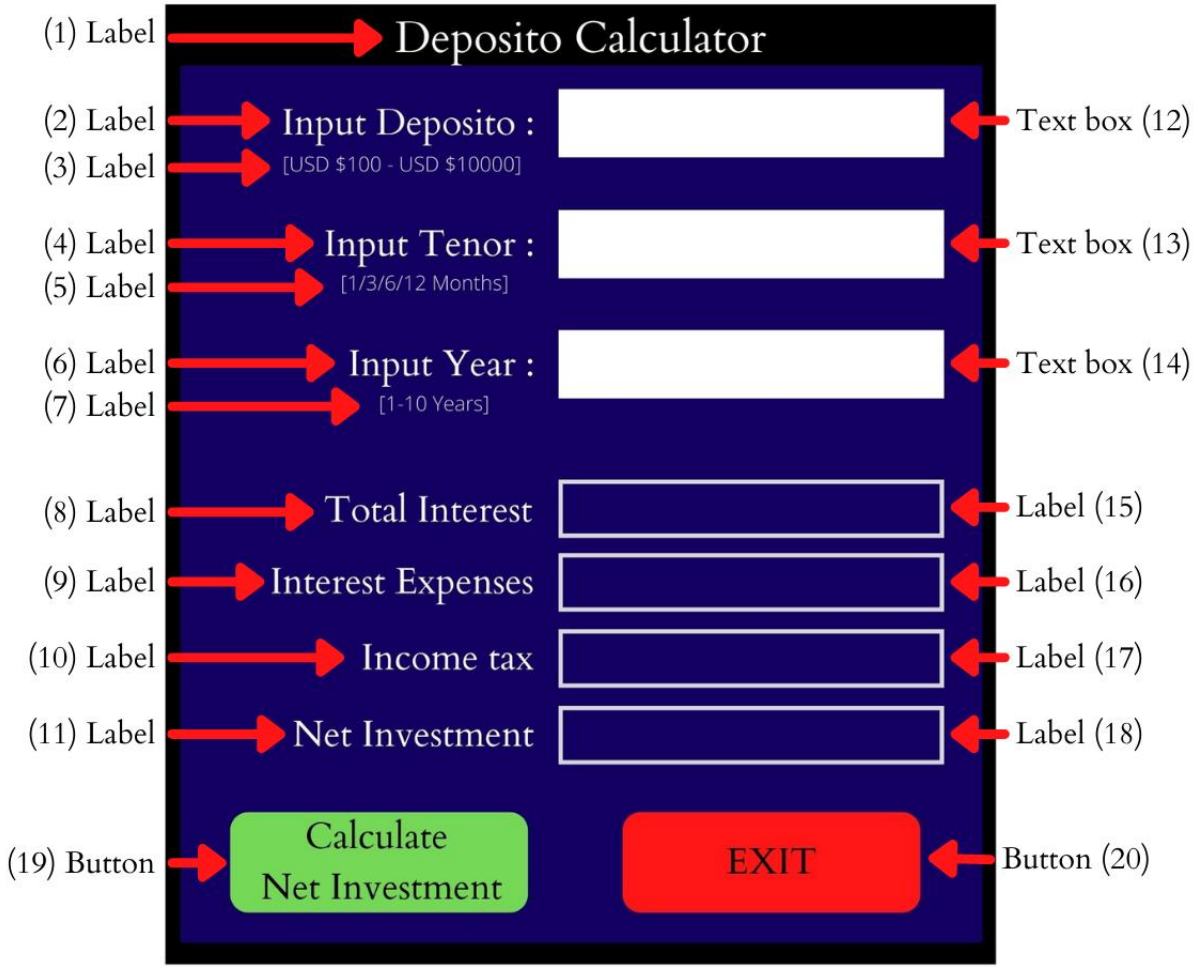
HAND TRACING

	Data Set 1	Data Set 2
deposito	200	5000
tenor	3	12
tahun	2	4
rep	8	4
bungaPerTahun	0.036	0.042
totalDep	214.86	5894.42
totalBunga	14.86	894.42
interestExp	0.15	8.94
incomeTax	0	178.88
netInvest	214.71	5706.59

Statement Number	Variable									
Dataset 1	deposito	tenor	tahun	rep	bungaPerTahun	totalDep	totalBunga	interestExp	incomeTax	netInvest
12	200									
44		3								
71			2							
103				8						
111					0.036					
123						214.86				
125				displayed						
125					displayed					
125						displayed				
131							14.86			
138								0.15		
144									0	
159										214.71
183	displayed									
184		displayed								
185			displayed							
186							displayed			
187								displayed		
188									displayed	
189										displayed

Statement Number	Variable									
Dataset 2	deposito	tenor	tahun	rep	bungaPerTahun	totalDep	totalBunga	interestExp	incomeTax	netInvest
12	5000									
44		12								
71			4							
103				4						
115					0.042					
123						5894.42				
125				displayed						
125					displayed					
125						displayed				
131							894.42			
138								8.94		
146									178.88	
159										5706.59
183	displayed									
184		displayed								
185			displayed							
186							displayed			
187								displayed		
188									displayed	
189										displayed

6. [LO 1 & LO 2, 10 poin] Buatkan desain Menu dan GUI & Event Program untuk 'Kalkulator Deposito' tersebut beserta sebuah tabel berisi daftar komponen dengan rincian nama komponen, tipe komponen, dan deskripsi singkatnya!



Component Number in Sketch	Component Type	Description	Name
1	Label	Title of the program	titleLabel
2	Label	Instructs the user to input the deposito	depositoLabel
3	Label	Description to input the deposito (Input must between USD $100 – USD $10000)	descDepositoLabel
4	Label	Instructs the user to input the tenor	tenorLabel
5	Label	Description to input the tenor (Input can only be 1/3/6/12)	descTenorLabel
6	Label	Instructs the user to input the year duration	yearLabel
7	Label	Description to input the year (Input must between 1 – 10 years)	descYearLabel
8	Label	Identifies total interest, which will be displayed next to this label	totalInterestLabel

9	Label	Identifies interest expenses, which will be displayed next to this label	interestExpLabel
10	Label	Identifies income tax, which will be displayed next to this label	incomeTaxLabel
11	Label	Identifies net investment, which will be displayed next to this label	netInvestLabel
12	Text box	This is where the user will input the deposito	depositoTextbox
13	Text box	This is where the user will input the tenor	tenorTextbox
14	Text box	This is where the user will input the year duration	yearTextbox
15	Label	This is where the program will display the total interest	displayTotalIntLabel
16	Label	This is where the program will display the interest expenses	displayIntExpLabel
17	Label	This is where the program will display the income tax	displayIncomeTaxLabel
18	Label	This is where the program will display the net investment	displayNetInvestLabel
19	Button	Tap / click this button to calculate and display total interest, interest expenses, income tax, and net investment	calculateNetInvestButton
20	Button	Tap / click this button to exit the program	exitButton