

# ENDSEM

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**Q.1**



```
Enter x:0
Answer is:7
```



Console



Enter x:3

Answer is:40

```
Console
Enter x:4
Answer is:59
```

Q.2

A]

a)String =T,T,NT,T==1101

```
Enter a string of outcomes [1==Taken] [0==Not taken] :1101
The accuracy of branch always taken predictor is 75%
The accuracy of branch always not taken predictor is 25%
0==Definite predict not taken
1==Probable predict not taken
2==Probable predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :0
The accuracy of 2 bit adder predictor is 0%
PS D:\architecture>
```

Two bit predictor accuracy for forever repetition 1101 (I did for 1 lakh)

```

PS D:\architecture> cd "d:\architecture\" ; if ($?) { g++ Q2_EndsemCS211.cpp -o Q2_EndsemCS211 }
Enter a string of outcomes [1==Taken] [0==Not taken] :1101
Enter number of times you want to repeat the string :100000
0==Definite predict not taken
1==Probable predict not taken
2==Probable predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :0
The accuracy of 2 bit adder predictor is 74.9993%
PS D:\architecture>

```

ii)String =T,T,T,NT,NT==11100

```

PS D:\architecture> cd "d:\architecture\" ; if ($?) { g++ Q2_EndsemCS211.cpp -o Q2_EndsemCS211 }
Enter a string of outcomes [1==Taken] [0==Not taken] :11100
The accuracy of branch always taken predictor is 60%
The accuracy of branch always not taken predictor is 40%
0==Definite predict not taken
1==Probable predict not taken
2==Probable predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :0
The accuracy of 2 bit adder predictor is 20%
PS D:\architecture>

```

Two bit predictor accuracy for forever repetition 1101 (I did for 1 lakh)

```

PS D:\architecture> cd "d:\architecture\" ; if ($?) { g++ Q2_EndsemCS211.cpp -o Q2_EndsemCS211 }
Enter a string of outcomes [1==Taken] [0==Not taken] :11100
Enter number of times you want to repeat the string :100000
0==Definite predict not taken
1==Probable predict not taken
2==Probable predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :0
The accuracy of 2 bit adder predictor is 39.9998%
PS D:\architecture>

```

i)String =T,T,NT,T==1101

Initial state=0(Definite predict not taken)

```
Enter a string of outcomes [1==Taken] [0==Not taken] :1101
The accuracy of branch always taken predictor is 75%
The accuracy of branch always not taken predictor is 25%
0==Definite predict not taken
1==Probable predict not taken
2==Probable predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :0
The accuracy of 2 bit adder predictor is 0%
PS D:\architecture>
```

Initial state=1(Probable predict not taken)

```
Enter a string of outcomes [1==Taken] [0==Not taken] :1101
The accuracy of branch always taken predictor is 75%
The accuracy of branch always not taken predictor is 25%
0==Definite predict not taken
1==Probable predict not taken
2==Probable predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :1
The accuracy of 2 bit adder predictor is 50%
PS D:\architecture>
```

Initial state=2(Probable predict taken)

```
Enter a string of outcomes [1==Taken] [0==Not taken] :1101
The accuracy of branch always taken predictor is 75%
The accuracy of branch always not taken predictor is 25%
0==Definite predict not taken
1==Probable predict not taken
2==Probable predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :2
The accuracy of 2 bit adder predictor is 75%
PS D:\architecture>
```

Initial state=3(Definite predict taken)

```

Enter a string of outcomes [1==Taken] [0==Not taken] :1101
The accuracy of branch always taken predictor is 75%
The accuracy of branch always not taken predictor is 25%
0==Definite predict not taken
1==Probable predict not taken
2==Probale predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :3
The accuracy of 2 bit adder predictor is 75%
PS D:\architecture>

```

**Predictor accuracy for 4 begin states in decreasing order**  
**3(75%)=2(75%)>1(50%)>0(0%)**

ii)String =T,T,T,NTN,T==1101

Initial state=0(Definite predict not taken)

```

Enter a string of outcomes [1==Taken] [0==Not taken] :11100
The accuracy of branch always taken predictor is 60%
The accuracy of branch always not taken predictor is 40%
0==Definite predict not taken
1==Probable predict not taken
2==Probale predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :0
The accuracy of 2 bit adder predictor is 20%
PS D:\architecture>

```

Initial state=1(Probable predict not taken)

```

Enter a string of outcomes [1==Taken] [0==Not taken] :11100
The accuracy of branch always taken predictor is 60%
The accuracy of branch always not taken predictor is 40%
0==Definite predict not taken
1==Probable predict not taken
2==Probale predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :1
The accuracy of 2 bit adder predictor is 40%
PS D:\architecture>

```

Initial state=2(Probable predict taken)

```

Enter a string of outcomes [1==Taken] [0==Not taken] :11100
The accuracy of branch always taken predictor is 60%
The accuracy of branch always not taken predictor is 40%
0==Definite predict not taken
1==Probable predict not taken
2==Probale predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :2
The accuracy of 2 bit adder predictor is 60%
PS D:\architecture>

```

Initial state=3(Definite predict taken)

```

PS D:\architecture> cd ..\architecture\ ; if ($?) { g++ Q2_EndSer
Enter a string of outcomes [1==Taken] [0==Not taken] :11100
The accuracy of branch always taken predictor is 60%
The accuracy of branch always not taken predictor is 40%
0==Definite predict not taken
1==Probable predict not taken
2==Probale predict taken
3==Definite predict taken
Enter a number (0,1,2,3) :3
The accuracy of 2 bit adder predictor is 60%
PS D:\architecture>

```

**Predictor accuracy for 4 begin states in decreasing order**  
**3(60%)=2(60%)>1(40%)>0(20%)**

### Q.3)Output is 32 as shown

project\_13 - [C:/Users/tambe/project\_13/project\_13.xpr] - Vivado 2018.2

File Edit Flow Tools Repgrts Window Layout View Run Help Q- Quick Access

250 ns

Ready

Default Layout

Flow Navigator

PROJECT MANAGER

- Settings
- Add Sources
- Language Templates
- IP Catalog

IP INTEGRATOR

- Create Block Design
- Open Block Design
- Generate Block Design

SIMULATION

- Run Simulation

RTL ANALYSIS

- Open Elaborated Design

SYNTHESIS

- Run Synthesis
- Open Synthesized Design

IMPLEMENTATION

- Run Implementation
- Open Implemented Design

PROGRAM AND DEBUG

Simulation Object: out

Scope

Name	Design U...	Block Type
alu	alu	Verilog M...
gbl	gbl	Verilog M...

Objects

Name	Value	Data Type
alu	4	Array
b[7...	16	Array
out...	32	Array
DS...	8	Array

Simulation Waveform

Name	Value	Time
a	04	0 ns
b	10	0 ns
c	20	0 ns
D	00000008	0 ns

Tcl Console

```
INFO: [USF-XSim-97] XSim simulation ran for 1000ns
add_force (/alu/a) -radix bin (100 0ns)
run all
```

Sim Time: 1 us