AY: 2024-25

Class:	SE	Semester:	III
Course Code:	CSC 304	Course Name:	DLCA

Name of Student:	Archita Deepak Gupta
Roll No. :	19
Assignment No.:	04
Title of Assignment:	Compare hardwired & microprogrammed control unit for CPU
Date of Submission:	
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	4
Demonstrated Knowledge	3	3
Legibility	2	1
Total	10	8

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge Legibility	3	2	1
Legibility	2	1	0

Checked by

Name of Faculty :

Signature : Bharat

Date : 11/10/24

ASS-4

DATE:

write a microprogram for the instruction ADD R1, R2

T-State	Operation	microinstructions-
T_1	PC → MAR	Pcout, MARin, Read, clear y, Set Cin, Add, Zin
T_2	m → MBR PC ← PC+1	Zout, PCin, Wait for memory fetch cycle.
T_3	MBR → IR	MBRout, IRin
T_4	R_1 → x	R1out, Xin, CLRC
T_5	R2 → ALU	R2out, ADD, Zin
T_6	Z → R_1	Zout, R1in
T_7	check for intr	Assumption enabled intr pending CLRx, SETc, SPout, SUB, Zin
T_8	SP ← SP-1	Zout, SPin, MARin
T_9	PC → MDR	PCout, MDRin, WRITE
T_{10}	MDR → [SP]	wait for mem access
T_{11}	PC ← Is Raddr	PCin Is Raddr out

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Q2. compare and contrast Hardwired control unit and microprogrammed control unit.

Sol. control unit can be designed using two ways
1. Hardwired control unit
2. Microprogrammed control unit.

	Aspect	Hardwired control unit	microprogrammed control unit
1.	Design	Built using fixed combinational logic circuits	It uses a microprogr -am stored in a control memory.
2.	control Signal generation	Directly generated by hardware circuits.	Generated by fetching microinstructions from control memory.
3.	Speed.	Faster, as signals are directly produced by the hardware.	Slower as each instruction involves memory fetch cycles.
4.	flexibility	less flexible: hard to modify or update instruction sets.	more flexible: instruction set can be easily modified.
5.	complexity	compler design; difficult to implement for large instruction sets	simpler design; easier to handle larger instruction sets.

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	Aspect	Hardwired Control unit	Microprogrammed Control unit.
6.	Cost	Higher initial design cost due to complex hardware design.	Lower initial cost, but requires additional memory.
7.	Performance.	High performance, suitable for system needing speed.	moderate performance, better suited for system needing versatility.
8.	modification.	Difficult; requires redesign of hard-ware circuit	Easier; changes can be made by updating microinstructions.

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