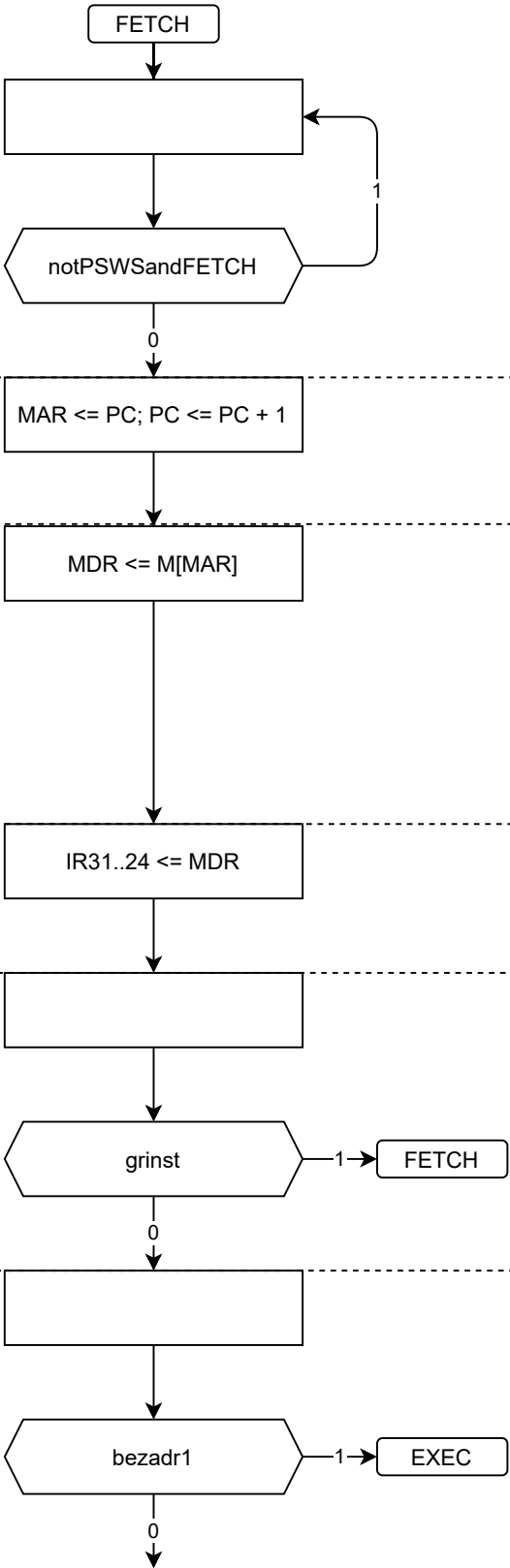
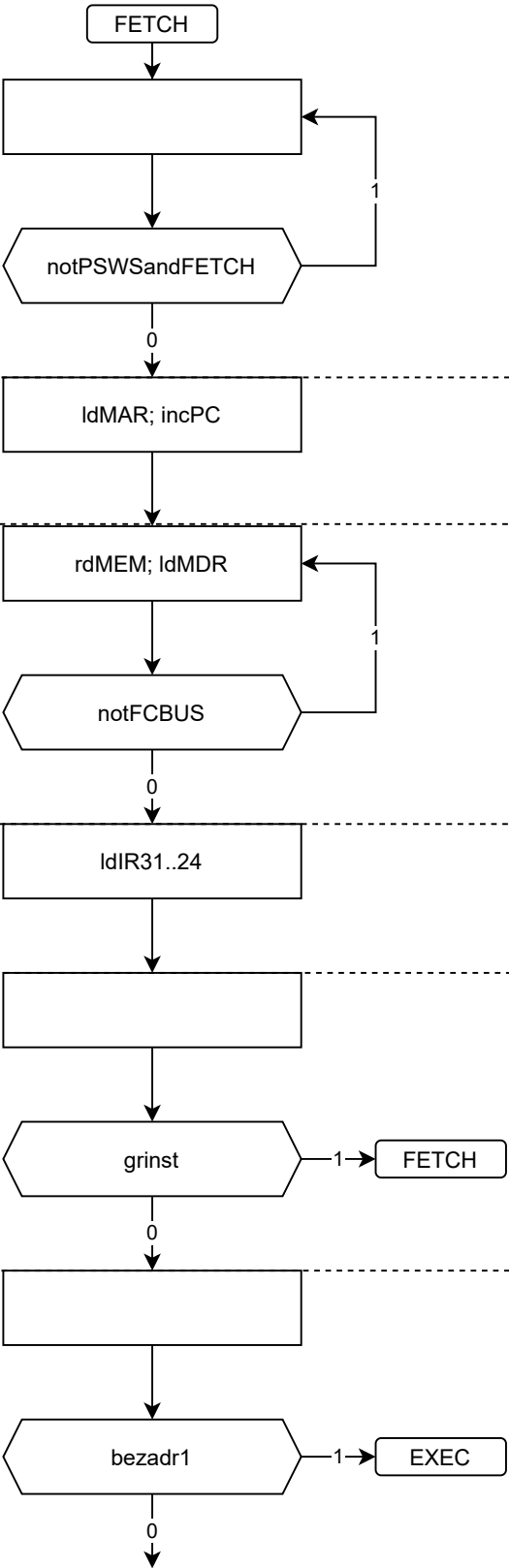


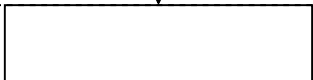
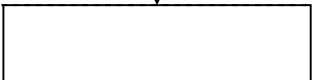
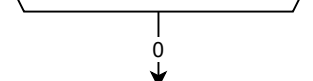
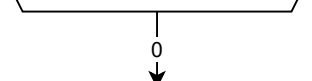

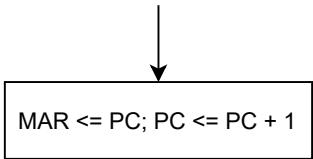
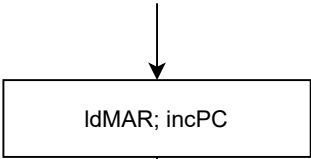
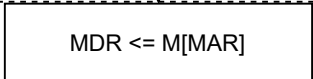
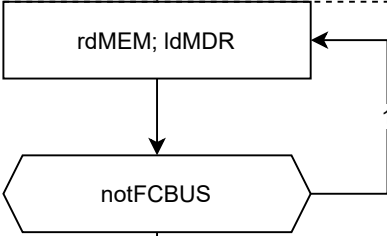
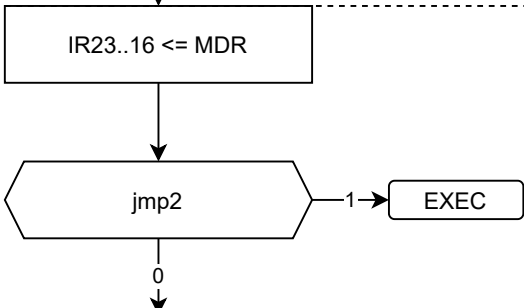
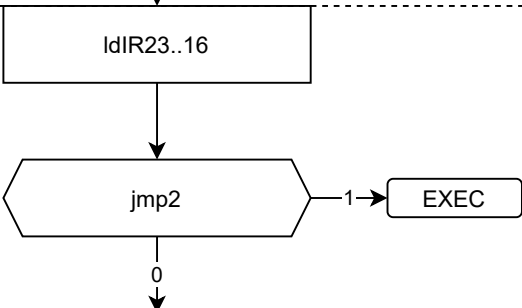
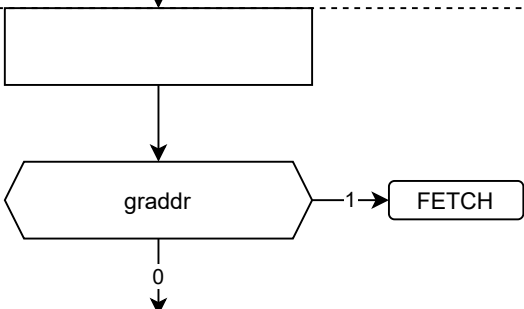
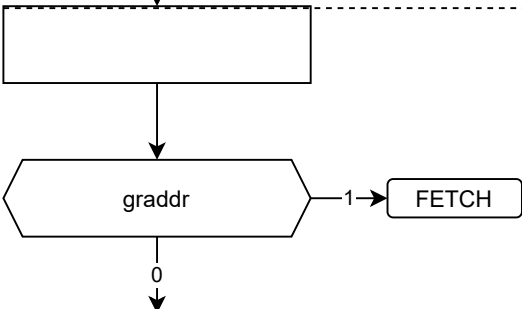
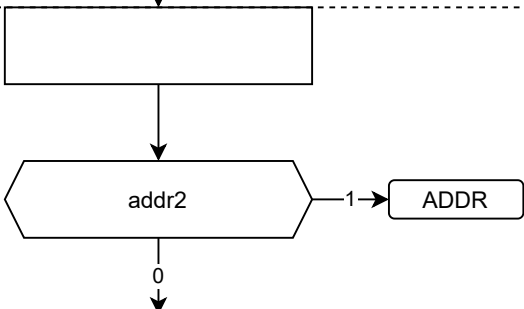
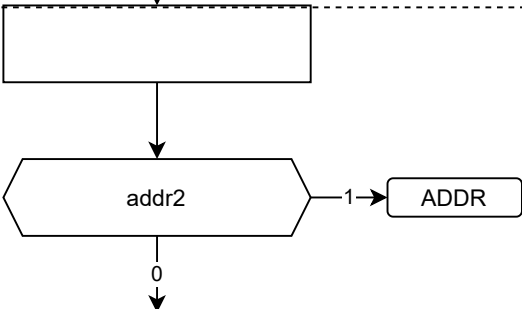
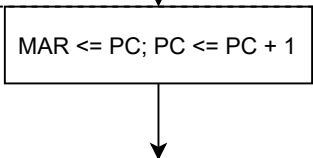
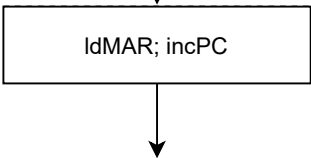

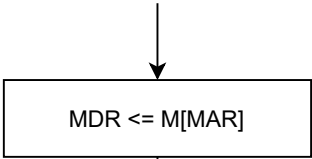
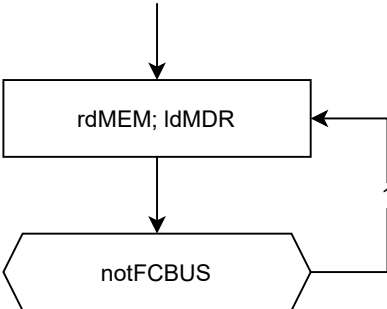
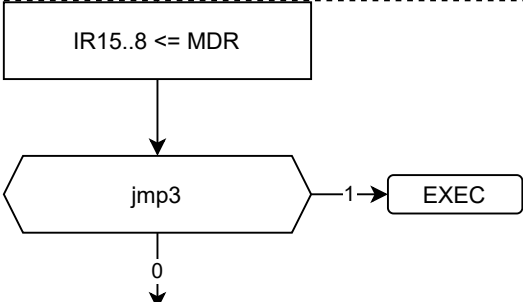
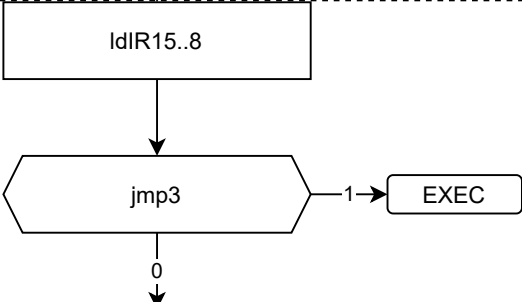
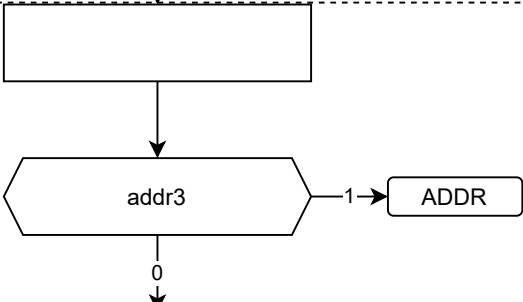
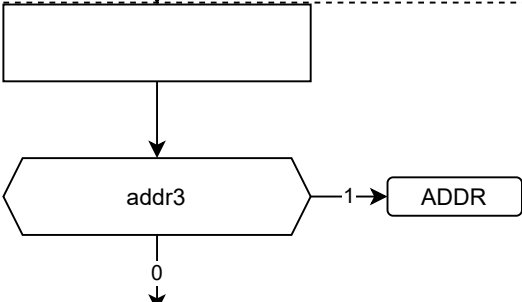
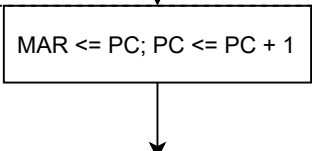
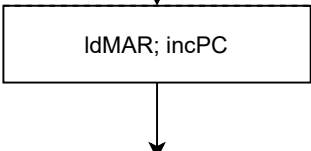
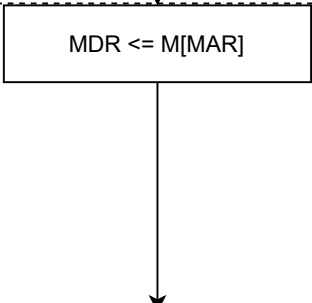
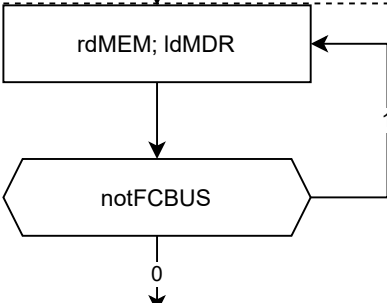
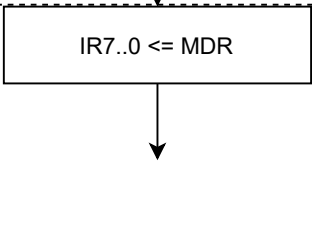
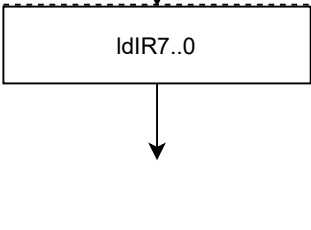



Дијаграм тока микрооперација		Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала	
				step00 br (if notPSWSandFETCH then step00)
MAR <= PC; PC <= PC + 1		IdMAR; incPC		step01 - Prvi bajt IdMAR, incPC
MDR <= M[MAR]		rdMEM; IdMDR		step02 rdMEM, IdMDR br (if notFCBUS then step02)
IR31..24 <= MDR		IdIR31..24		step03 IdIR31..24
				step04 br (if grinst then step00)
grinst		grinst		
				step05 br (if bezadr1 then step13)
bezadr1		bezadr1		
				
	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:		Датум	Страна
	Назив: Основи рачунарске технике 2 FETCH		28.2.2021	1/4


Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
		step06 - Drugi bajt ldMAR, incPC
		step07 rdMEM, ldMDR br (if notFCBUS then step07)
		step08 ldIR23..16 br (if jmp2 then step13)
		step09 br (if graddr then step00)
		step0A br (if addr2 then step12)
		step0B - Treci bajt ldMAR, incPC

	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:		Датум	Страна
	Назив: Основи рачунарске технике 2 FETCH		28.2.2021	2/4

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
		step0C rdMEM, ldMDR br (if notFCBUS step0C)
		step0D ldIR15..8 br (if jmp3 step13)
		step0E br (if addr3 step12)
		step0F - Четврти байт ldMAR, incPC
		step10 rdMEM, ldMDR br (if notFCBUS step10)
		step11 ldIR7..0

	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:			Датум
	Назив: Основи рачунарске технике 2 FETCH			Страна 3/4

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
<pre> graph TD ADDR[ADDR] --> B1[FETCH <= 0; ADDR <= 1] B1 --> F1[FETCH] F1 --> E1[EXEC] E1 --> B2[FETCH <= 0; EXEC <= 1] B2 --> F2[FETCH] </pre>	<pre> graph TD ADDR[ADDR] --> B1[stADDR] B1 --> F1[FETCH] F1 --> E1[EXEC] E1 --> B2[stEXEC] B2 --> F2[FETCH] </pre>	<p>step12 stADDR br step00</p>
<pre> graph TD ADDR[ADDR] --> B1[stADDR] B1 --> F1[FETCH] F1 --> E1[EXEC] E1 --> B2[stEXEC] B2 --> F2[FETCH] </pre>	<pre> graph TD ADDR[ADDR] --> B1[stADDR] B1 --> F1[FETCH] F1 --> E1[EXEC] E1 --> B2[stEXEC] B2 --> F2[FETCH] </pre>	<p>step13 stEXEC br step00</p>

	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:		Датум	Страна
	Назив: Основи рачунарске технике 2 FETCH		28.2.2021	4/4

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
		<p>step0 mx br (case((immed, regdir), ADDR, (memdir, regind, brpom, bxpom)))</p>
		<p>step1 - immed/regdir ldB15..8, ldB7..0 br step7</p>
		<p>step2 - memdir/regind/brpom/bxpom ldMAR br (if ST + JADR + STRLEN step7)</p>
		<p>step3 - Citanje podatka sa adrese rdMEM, ldMDR br (if notFCBUS step3)</p>
		<p>step4 ldB15..8, incMAR</p>



Име и презиме

Урош Лончар

Потпис:

Назив:

Индекс

2019/0691

Пројекат

Задатак 27

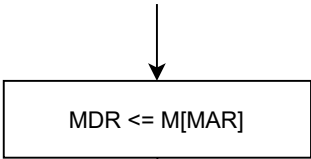
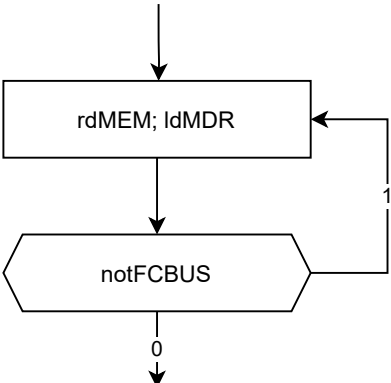
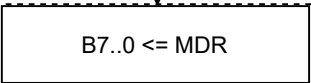
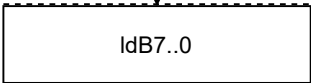


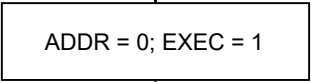
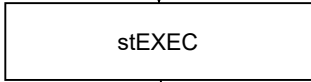
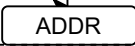
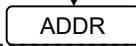
Датум


28.2.2021

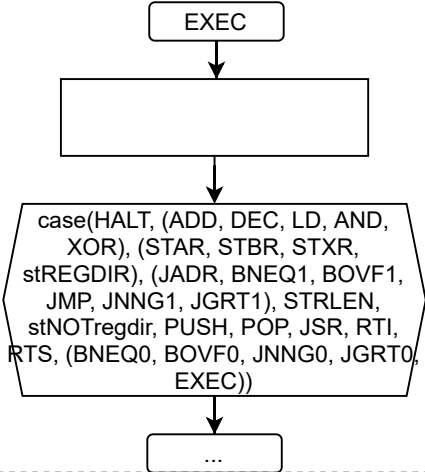
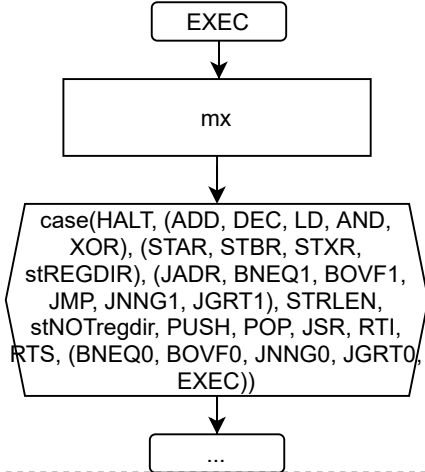
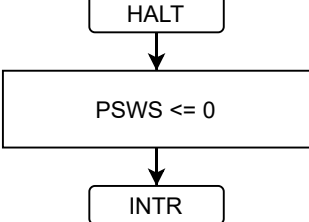
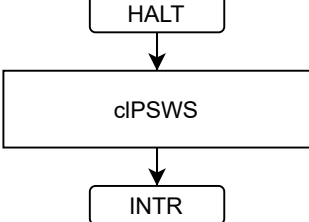
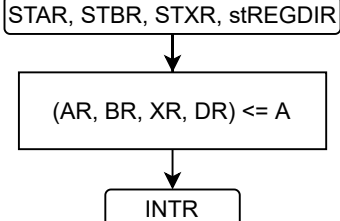
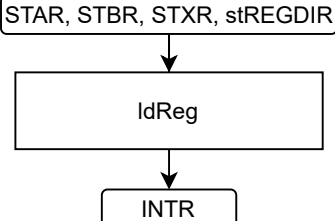
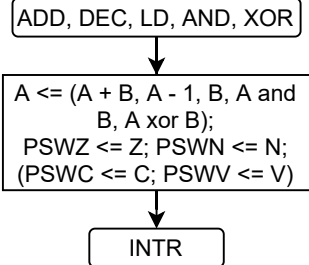
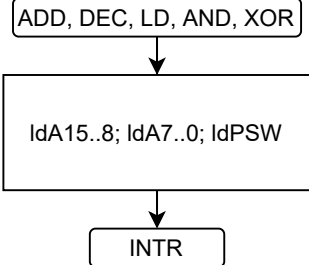
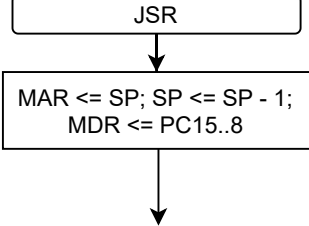
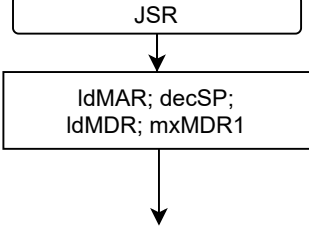
Страна


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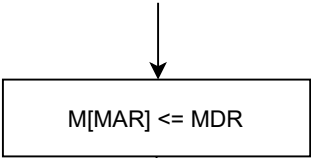
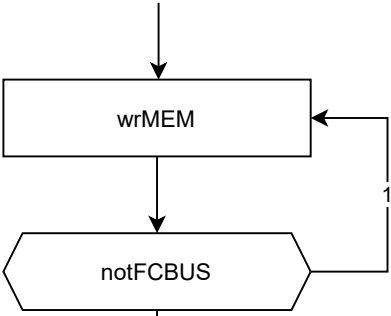
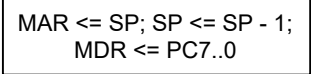
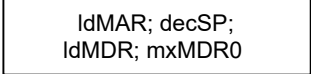
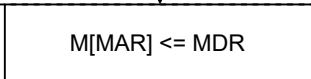
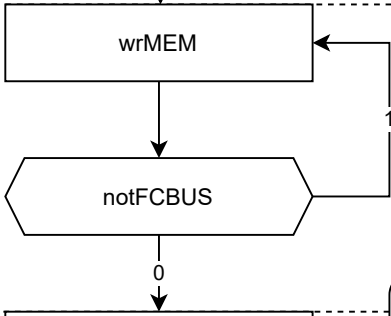
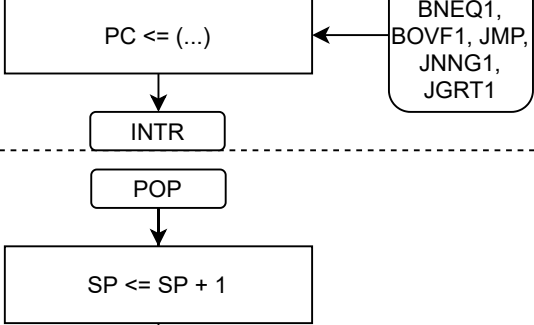
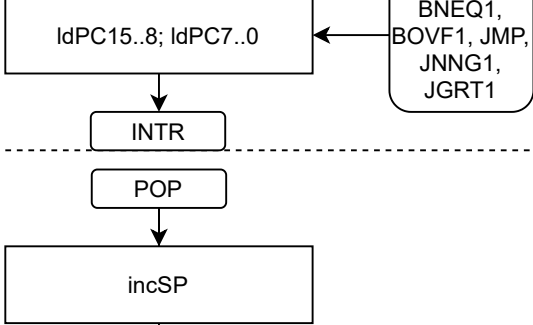
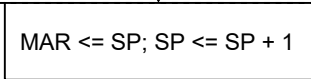
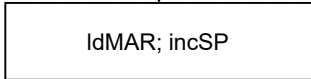
Основи рачунарске технике 2 ADDR


Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
 <pre> graph TD Start(()) --> MDR[MDR <= M[MAR]] MDR --> End1(()) </pre>	 <pre> graph TD Start(()) --> rdMEM[rdMEM; ldMDR] rdMEM --> notFCBUS{{notFCBUS}} notFCBUS -- 1 --> rdMEM notFCBUS -- 0 --> ldB7[ldB7..0] ldB7 --> EXEC1[EXEC] EXEC1 --> stEXEC[stEXEC] stEXEC --> ADDR1[ADDR] </pre>	<p>step5 rdMEM, ldMDR br (if notFCBUS step5)</p>
 <pre> graph TD Start(()) --> B7[B7..0 <= MDR] B7 --> End2(()) </pre>	 <pre> graph TD Start(()) --> ldB7[ldB7..0] ldB7 --> End3(()) </pre>	<p>step6 ldB7..0</p>
 <pre> graph TD Start(()) --> EXEC[EXEC] EXEC --> End4(()) </pre>	 <pre> graph TD Start(()) --> EXEC[EXEC] EXEC --> End5(()) </pre>	<p>step7 stEXEC br step0</p>
 <pre> graph TD Start(()) --> ADDR[ADDR = 0; EXEC = 1] ADDR --> End6(()) </pre>	 <pre> graph TD Start(()) --> stEXEC[stEXEC] stEXEC --> End7(()) </pre>	
 <pre> graph TD Start(()) --> ADDR[ADDR] ADDR --> End8(()) </pre>	 <pre> graph TD Start(()) --> ADDR[ADDR] ADDR --> End9(()) </pre>	

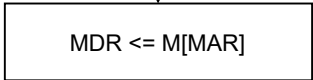
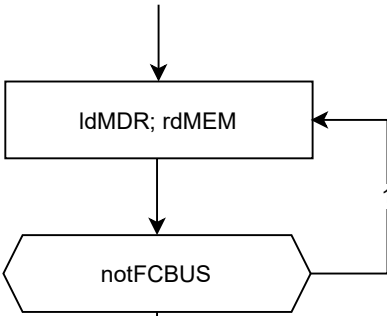
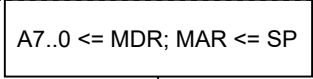
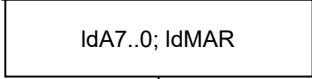
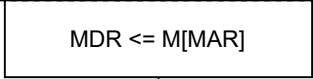
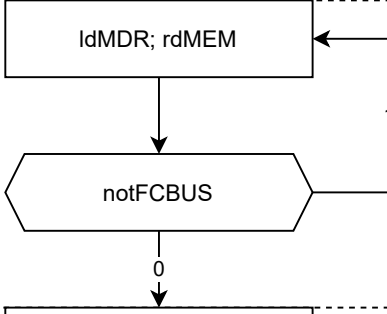
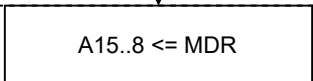
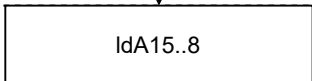
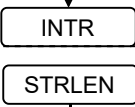
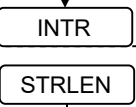
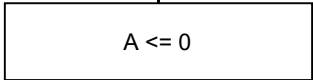
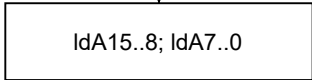

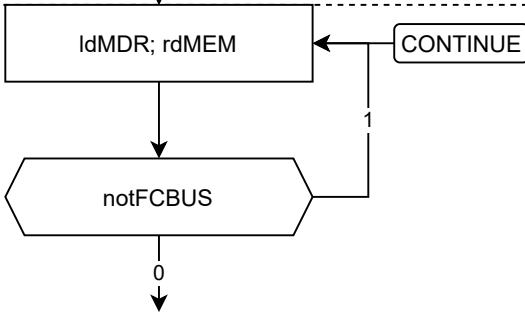
	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:		Датум	Страна
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Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
		<p>step00 mx br (case(HALT, (ADD, DEC, LD, AND, XOR), (STAR, STBR, STXR, stREGDIR), (JADR, BNEQ1, BOVF1, JMP, JNNG1, JGRT1), STRLEN, stNOTregdir, PUSH, POP, JSR, RTI, RTS, (BNEQ0, BOVF0, JNNG0, JGRT0, EXEC)))</p>
		<p>step01 - HALT cIPSWs br step2B</p>
		<p>step02 - STAR, STBR, STXR, ST + regdir ldReg br step2B</p>
		<p>step03 - ADD, DEC, LD, AND, XOR ldA15..8, ldA7..0, ldPSW br step2B</p>
		<p>step04 - JSR ldMAR, decSP, ldMDR, mxMDR1</p>

	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:			Датум
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Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
 <pre> graph TD Start(()) --> Step05[M[MAR] <= MDR] Step05 --> Step06[MAR <= SP; SP <= SP - 1; MDR <= PC7..0] </pre>	 <pre> graph TD Start(()) --> Step05[wrMEM] Step05 --> Step05a{notFCBUS} Step05a -- 1 --> Step05 Step05a -- 0 --> Step06[ldMAR; decSP; ldMDR; mxMDR0] </pre>	step05 wrMEM br (if notFCBUS step05)
 <pre> graph TD Step06[MAR <= SP; SP <= SP - 1; MDR <= PC7..0] --> Step07[M[MAR] <= MDR] </pre>	 <pre> graph TD Step06[ldMAR; decSP; ldMDR; mxMDR0] --> Step07[wrMEM] </pre>	step06 ldMAR, decSP, ldMDR, mxMDR0
 <pre> graph TD Step07[M[MAR] <= MDR] --> Step08[PC <= (...)] </pre>	 <pre> graph TD Step07[wrMEM] --> Step07a{notFCBUS} Step07a -- 1 --> Step07 Step07a -- 0 --> Step08[ldPC15..8; ldPC7..0] </pre>	step07 wrMEM br (if notFCBUS step07)
 <pre> graph TD Step08[PC <= (...)] --> Step08a[INTR] Step08a --> Step08b[POP] Step08b --> Step08c[SP <= SP + 1] Step08c --> Step09[MAR <= SP; SP <= SP + 1] </pre>	 <pre> graph TD Step08[ldPC15..8; ldPC7..0] --> Step08a[INTR] Step08a --> Step08b[POP] Step08b --> Step08c[incSP] Step08c --> Step09[ldMAR; incSP] </pre>	step08 ldPC15..8, ldPC7..0 br step2B
 <pre> graph TD Step09[MAR <= SP; SP <= SP + 1] --> End(()) </pre>	 <pre> graph TD Step09[ldMAR; incSP] --> End(()) </pre>	step09 - POP incSP
		step0A ldMAR, incSP


	Име и презиме	Индекс	Пројекат	
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	Назив: Основи рачунарске технике 2 ЕХЕС		28.2.2021	2/7

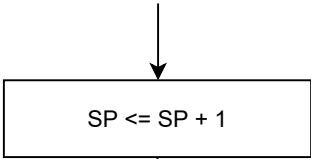
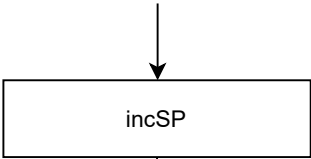
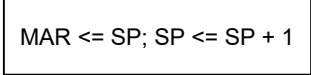
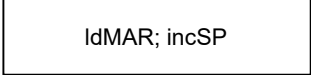
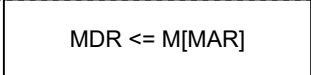
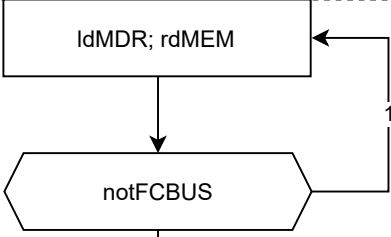
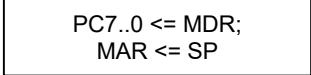
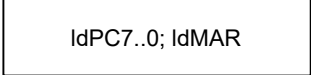
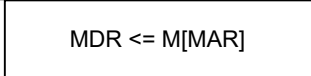
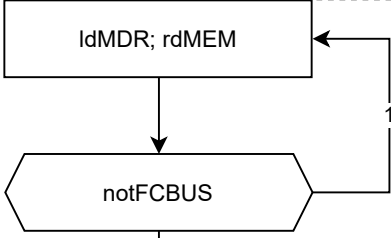
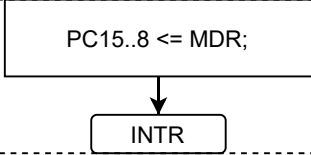
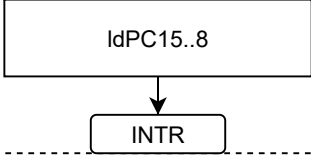
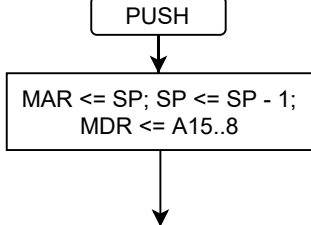
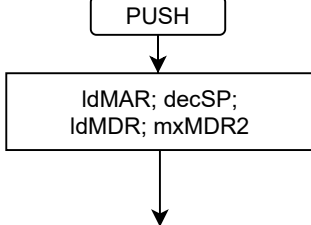
Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
		step0B IdMDR, rdMEM br (if notFCBUS step0B)
		step0C IdA7..0, IdMAR
		step0D IdMDR, rdMEM br (if notFCBUS step0D)
		step0E IdA15..8
		br step2B
		step0F - STRLEN IdA15..8, IdA7..0
		step10 IdMDR, rdMEM br (if notFCBUS step10)


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	Назив: Основи рачунарске технике 2 ЕХЕС		28.2.2021	3/7

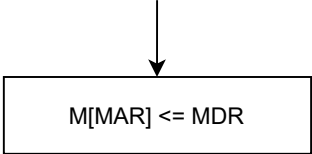
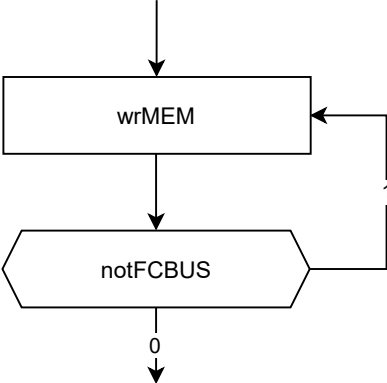
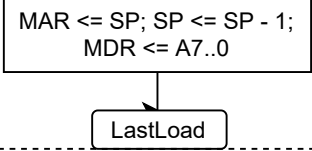
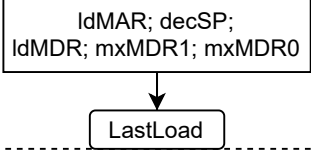
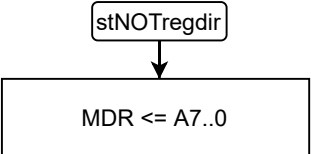
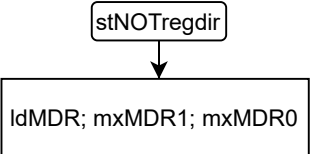
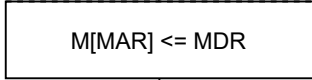
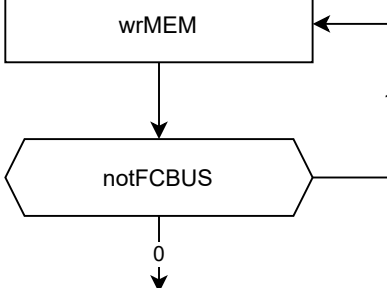
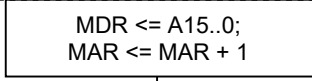
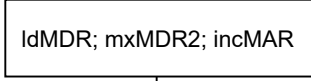
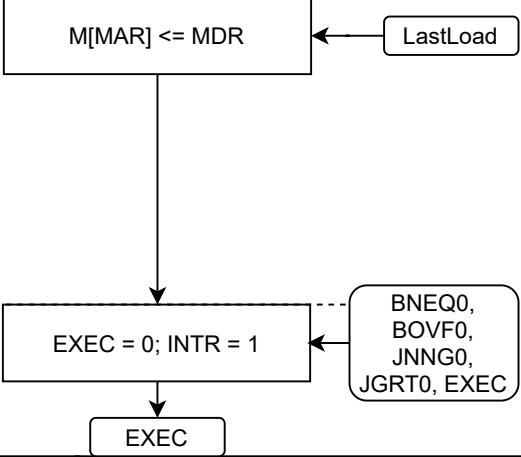
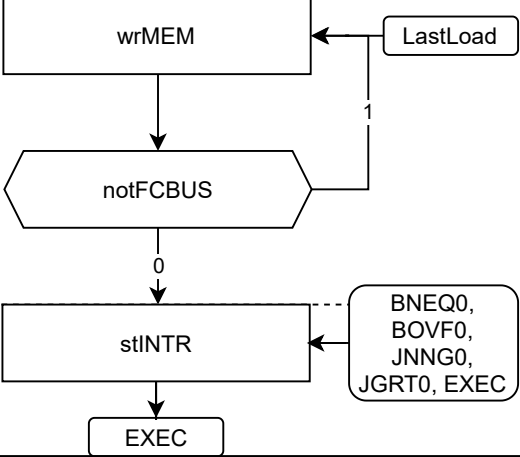
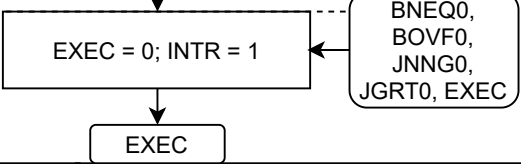
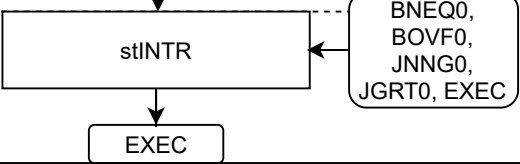

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
<pre> graph TD Start(()) --> MDR_Z{MDR_Z} MDR_Z -- 1 --> Break1[BREAK] MDR_Z -- 0 --> Step12[MAR <= MAR + 1; A <= A + 1] </pre>	<pre> graph TD Start(()) --> MDR_Z{MDR_Z} MDR_Z -- 1 --> Break1[BREAK] MDR_Z -- 0 --> Step12[incMAR; incA] </pre>	step11 br (if MDR_Z step13)
<pre> graph TD Step12[MAR <= MAR + 1; A <= A + 1] --> Continue1[CONTINUE] </pre>	<pre> graph TD Step12[incMAR; incA] --> Continue1[CONTINUE] </pre>	step12 incMAR, incA br step10
<pre> graph TD Break1[BREAK] --> Step13[PSWZ <= Z, PSWV <= V] Step13 --> Intra[INTR] </pre>	<pre> graph TD Break1[BREAK] --> Step13[IdPSW] Step13 --> Intra[INTR] </pre>	step13 IdPSW br step2B
<pre> graph TD Intra[INTR] --> RTI[RTI] RTI --> Step14[SP <= SP + 1] </pre>	<pre> graph TD Intra[INTR] --> RTI[RTI] RTI --> Step14[incSP] </pre>	step14 - RTI incSP
<pre> graph TD Step14[SP <= SP + 1] --> Step15[MAR <= SP; SP <= SP + 1] </pre>	<pre> graph TD Step14[incSP] --> Step15[IdMAR; incSP] </pre>	step15 IdMAR, incSP
<pre> graph TD Step15[MAR <= SP; SP <= SP + 1] --> Step16[MDR <= M[MAR]] </pre>	<pre> graph TD Step15[IdMAR; incSP] --> Step16[IdMDR; rdMEM] Step16 --> notFCBUS{notFCBUS} notFCBUS -- 1 --> Step16 notFCBUS -- 0 --> Step17[IdPSW; IdMAR; incSP] </pre>	step16 IdMDR, rdMEM br (if notFCBUS step16)
<pre> graph TD Step16[MDR <= M[MAR]] --> Step17[PSW7..0 <= MDR; MAR <= SP; SP <= SP + 1] </pre>	<pre> graph TD Step16[IdMDR; rdMEM] --> Step17[IdPSW; IdMAR; incSP] </pre>	step17 IdPSW, IdMAR, incSP

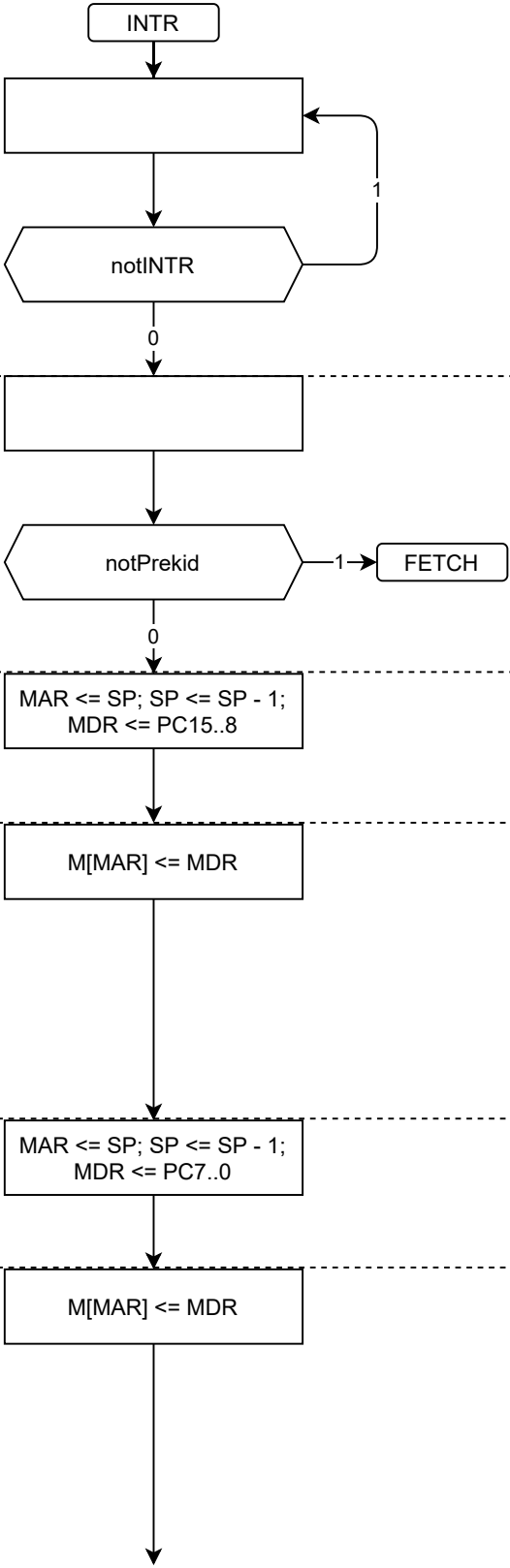
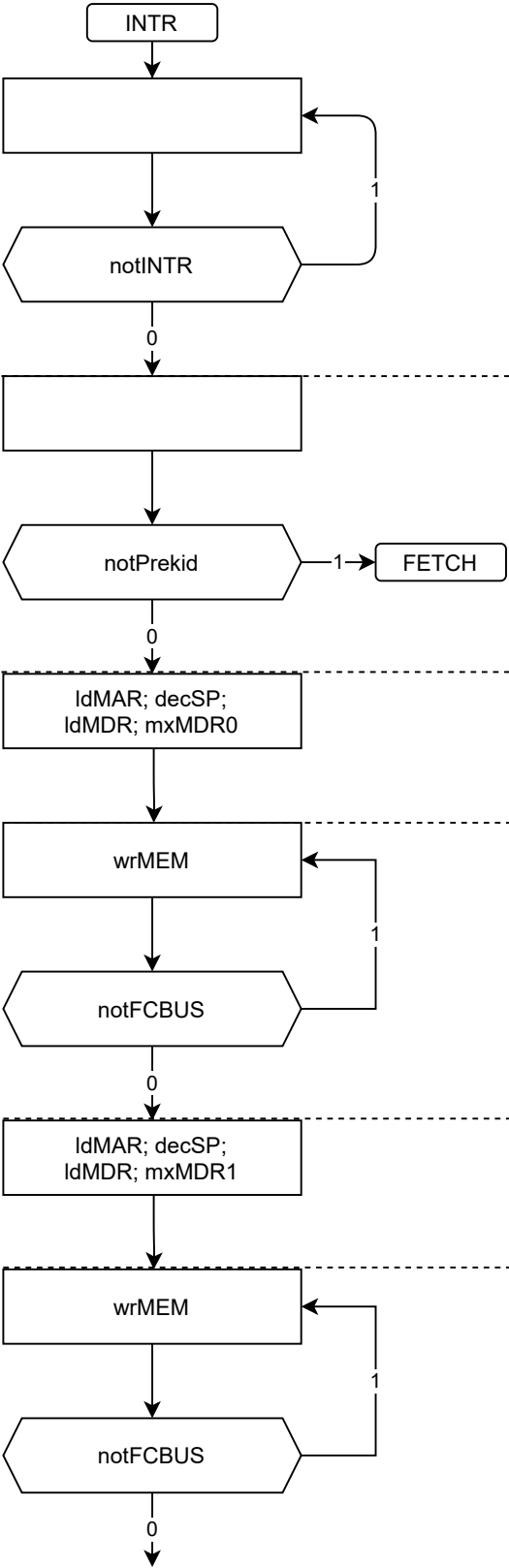

	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:		Датум	Страна
	Назив: Основи рачунарске технике 2 EXEC		28.2.2021	4/7


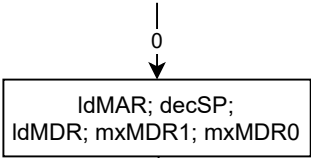
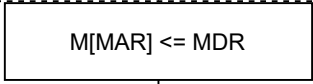
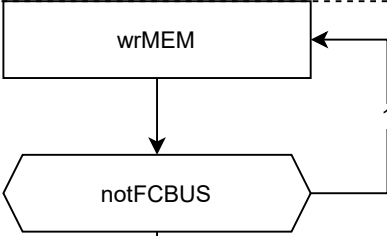
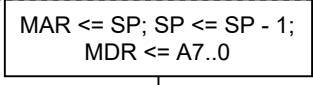
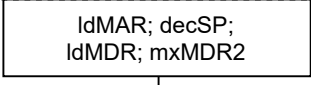
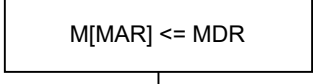
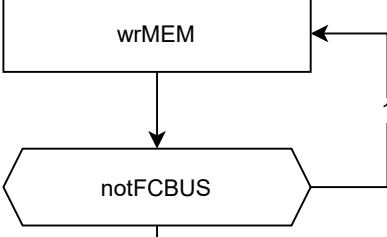
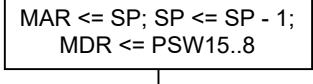
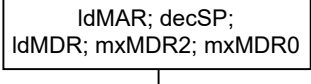
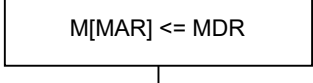
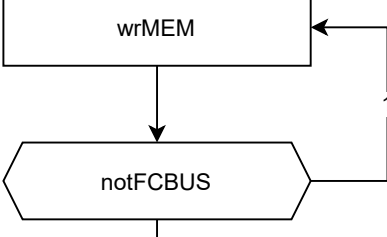
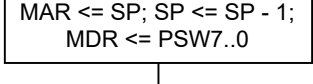
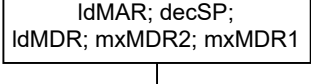
Дијаграм тока микрооперација		Дијаграм тока управљачких сигнала		Секвенца управљачких сигнала		
<div><div>↓</div><div>MDR <= M[MAR]</div><div>↓</div><div>PSW15..8 <= MDR; MAR <= SP; SP <= SP + 1</div><div>↓</div><div>MDR <= M[MAR]</div><div>↓</div><div>A7..0 <= MDR; MAR <= SP</div><div>↓</div><div>MDR <= M[MAR]</div><div>↓</div><div>A15..8 <= MDR;</div><div>↓</div><div>RTS</div><div>↓</div></div>		<div><div>↓</div><div>ldMDR; rdMEM</div><div>↓</div><div>notFCBUS</div><div>1</div><div>↓</div><div>ldPSWI; ldMAR; incSP</div><div>↓</div><div>ldMDR; rdMEM</div><div>↓</div><div>notFCBUS</div><div>1</div><div>↓</div><div>ldA7..0; ldMAR</div><div>↓</div><div>ldMDR; rdMEM</div><div>↓</div><div>notFCBUS</div><div>1</div><div>↓</div><div>ldA15..8</div><div>↓</div><div>RTS</div><div>↓</div></div>		<div>step18 ldMDR, rdMEM br (if notFCBUS step18)</div> <div>step19 ldPSWI, ldMAR, incSP</div> <div>step1A ldMDR, rdMEM br (if notFCBUS step1A)</div> <div>step1B ldA7..0, ldMAR</div> <div>step1C ldMDR, rdMEM br (if notFCBUS step1C)</div> <div>step1D ldA15..8</div>		
	Име и презиме		Индекс		Пројекат	
	Урош Лончар		2019/0691		Задатак 27	
	Потпис:				Датум	Страна
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Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
		step1E - RTS incSP
		step1F IdMAR, incSP
		step20 IdMDR, rdMEM br (if notFCBUS step20)
		step21 IdPC7..0, IdMAR
		step22 IdMDR, rdMEM br (if notFCBUS step22)
		step23 IdPC15..8 br step2B
		step24 - PUSH IdMAR, decSP, IdMDR, mxMDR2

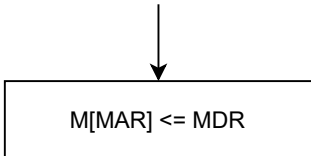
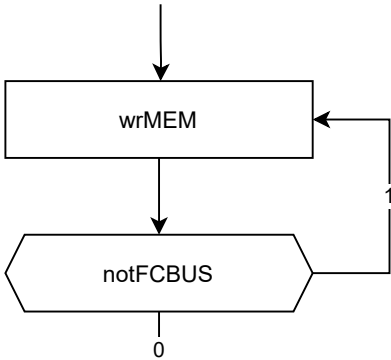
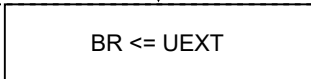

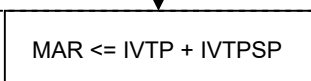
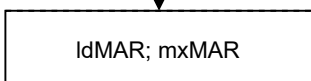
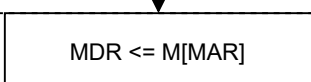
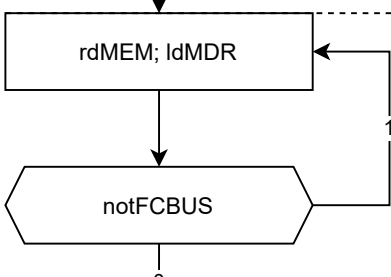
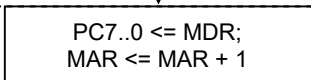
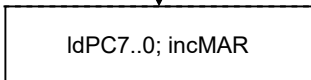
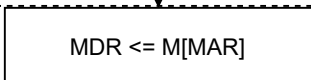
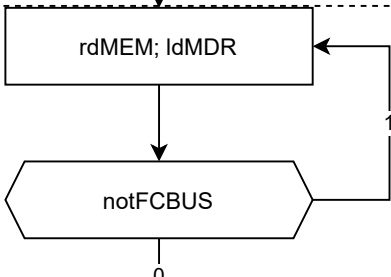
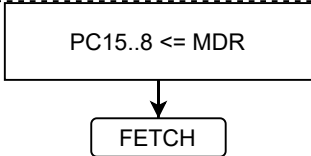
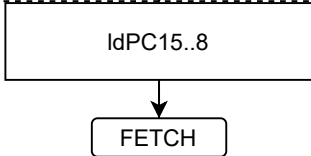
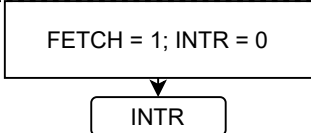
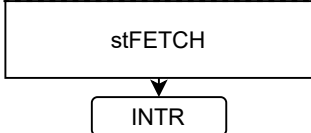

	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:	Основи рачунарске технике 2 ЕХЕС		Датум
	Назив:			Страна
			28.2.2021	6/7

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала	
		step25 wrMEM br (if notFCBUS step25)	
		step26 IdMAR, decSP, IdMDR, mxMDR1, mxMDR0 br step2A	
		step27 IdMDR, mxMDR1, mxMDR0	
		step28 wrMEM br (if notFCBUS step28)	
		step29 IdMDR, mxMDR2, incMAR	
		step2A wrMEM br (if notFCBUS step2A)	
		step2B stINTR br step00	
	Име и презиме	Пројекат	
	Урош Лончар	Задатак 27	
	Потпис:	Датум	Страна
	Назив: Основи рачунарске технике 2 EXEC	28.2.2021	7/7

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала	
 <pre> graph TD INTR[INTR] --> B1[] B1 --> notINTR{{notINTR}} notINTR -- 1 --> B1 notINTR -- 0 --> B2[] B2 --> notPrekid{{notPrekid}} notPrekid -- 1 --> FETCH[FETCH] notPrekid -- 0 --> B3["MAR <= SP; SP <= SP - 1; MDR <= PC15..8"] B3 --> B4["M[MAR] <= MDR"] B4 --> B5["MAR <= SP; SP <= SP - 1; MDR <= PC7..0"] B5 --> B6["M[MAR] <= MDR"] B6 --> Exit[] </pre>	 <pre> graph TD INTR[INTR] --> B1[] B1 --> notINTR{{notINTR}} notINTR -- 1 --> B1 notINTR -- 0 --> B2[] B2 --> notPrekid{{notPrekid}} notPrekid -- 1 --> FETCH[FETCH] notPrekid -- 0 --> B3["ldMAR; decSP; ldMDR; mxMDR0"] B3 --> wrMEM[wrMEM] wrMEM --> notFCBUS{{notFCBUS}} notFCBUS -- 1 --> wrMEM notFCBUS -- 0 --> B4["ldMAR; decSP; ldMDR; mxMDR1"] B4 --> wrMEM2[wrMEM] wrMEM2 --> notFCBUS2{{notFCBUS}} notFCBUS2 -- 1 --> wrMEM2 notFCBUS2 -- 0 --> Exit[] </pre>	step00 br (if notINTR step00)	
		step01 br (if notPrekid step14)	
		step02 ldMAR, decSP, ldMDR, mxMDR0	
		step03 wrMEM br (if notFCBUS step03)	
		step04 ldMAR, decSP, ldMDR, mxMDR1	
		step05 wrMEM br (if notFCBUS step05)	
	Име и презиме	Пројекат	
	Урош Лончар	Задатак 27	
	Потпис:	Датум	Страна
	Назив: Основи рачунарске технике 2 INTR	28.2.2021	1/3

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала
		step06 IdMAR, decSP, IdMDR, mxMDR1, mxMDR0
		step07 wrMEM br (if notFCBUS step07)
		step08 IdMAR, decSP, IdMDR, mxMDR2
		step09 wrMEM br (if notFCBUS step09)
		step0A IdMAR, decSP, IdMDR, mxMDR2, mxMDR0
		step0B wrMEM br (if notFCBUS step0B)
		step0C IdMAR, decSP, IdMDR, mxMDR2, mxMDR1

	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:		Датум	Страна
	Назив: Основи рачунарске технике 2 INTR		28.2.2021	2/3

Дијаграм тока микрооперација	Дијаграм тока управљачких сигнала	Секвенца управљачких сигнала		
		step0D wrMEM br (if notFCBUS step0D)		
		step0E ldBR		
		step0F ldMAR, mxMAR		
		step10 rdMEM, ldMDR br (if notFCBUS step10)		
		step11 ldPC7..0, incMAR		
		step12 rdMEM, ldMDR br (if notFCBUS step12)		
		step13 ldPC15..8		
		step14 stFETCH br step00		
	Име и презиме	Индекс	Пројекат	
	Урош Лончар	2019/0691	Задатак 27	
	Потпис:		Датум	Страна
	Назив: Основи рачунарске технике 2 INTR		28.2.2021	3/3