GANDAKI COLLEGE OF ENGINEERING AND SCIENCE

Internal Exam

Level: Bachelor | Semester: Spring | Year : 2024

Programme: Software | Full Marks: 100

Course: System Programming(NEW) | Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Compare the two machine architectures mainly SIC and SIC/XE machine architectures. 8

   b) Identify the addressing mode and target address if the instruction is 012030 where PC= 2000, B = 5030 and X= 3000. 5

2. a) Explain the machine dependent assembler features with example if possible. 8

   b) Why is forward reference a problem for assembler? How does assembler try to solve the forward reference issues?

   Or

   Explain the assembler design options in detail. 7

3. a) Consider the following assembly language program. 8

Mnemonic	Opcode
LDS	6C
LDT	74
LDX	04
LDA	00
ADD	18
STA	0C
ADDR	90
COMPR	A0
JLT	38

Line	Symbol	Opcode	Exp
10	EXAMPLE	START	4000
20		LDS	#3
30		LDT	#300
40		LDX	#0
50	ADDLP	LDA	ALPHA,X
60		ADD	BETA,X
70		STA	GAMMA,X
80		ADDR	S,X
90		COMPR	X,T
100		JLT	ADDLP
110	ALPHA	RESW	100
120	BETA	RESW	100
130	GAMMA	RESW	100
140		END	EXAMPLE

i) Show all data structures.

ii) Create an object code column with object code.

b) Explain the main concepts of the Relocating loader. Use question number 3 a as the reference if required. 7

4. a) Consider the following assembly language program. **10**

Line	Symbol	Opcode	Exp
10	SUM	START	5000
20	FIRST	LDX	ZERO
30		LDA	ZERO
40	LOOP	ADD	TABLE,X
50		TIX	COUNT
60		JLT	LOOP
70		STA	TOTAL
80		RSUB	
90	TABLE	RESW	2000
100	COUNT	WORD	10
110	ZERO	WORD	0
120	TOTAL	RESW	1
130		END	FIRST

LDX = 04, LDA =00, ADD =18, TIX = 2C, STA =0C, RSUB =4C,JLT =38

1) Fill the column for location counter.
2) Create object code table with object codes.
3) Create object program file.
4) Load the program into the memory.

b) Draw the object diagram of assembler and explain it. 7

5. a) What do you understand by macro processor? Explain the conditional macro expansion with example. 8

b) Explain the working principle of the concatenation of macro parameters and generation of unique labels in the machine independent macro processor features. 7

6. a) Explain the different phases of compiler with neat block diagram 7

b) What do you understand by the grammar? How do you generate the 8 strings from a grammar?

OR

Explain the intermediate code generation.

7. Write short notes on: **(Any two)** 2×5

a. Booch's macro process
b. Multipass assembler
c. Recursive descent parsing.