Course Code : CST 301

EIQU/RW – 16/1054

Fifth Semester B. E. (Computer Science and Engineering) Examination

SYSTEM PROGRAMMING

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

(1) All questions carry marks as indicated against them.

(2) Assume suitable data and Illustrate answers with neat sketches wherever necessary.

1. (a) What is the purpose of USING pseudo – op in assembly language program ? Can you write an assembly language program without using USING instructions ? How ? What are the limitations ? 4

(b) Design flowchart for Pass – 2 of Assembler. 6

OR

(c) For the following Assembly language program

(i) Show the symbol table at the end of pass 1

(ii) Show the base register table in pass 2

(iii) Show the generated machine code from pass 2

```
SUB     START   0
        USING   SUB,15
        USING   TABLE,3
        LH      4,FIFTY
        LH      5,B
        BCR     15,14
FIFTY   DC      H' 50'
TABLE   DSECT
A       DS      F
B       DS      H
C       DS      H
        END
```

6

2. (a) Describe how MDLC help in designing a macro capable of handling macro within macro. 3

OR

(b) Discuss the advantages and disadvantages of combining a macroprocessor with pass – 1 of assembler. 3

(c) For the following program show :— 7

(i) The expanded assembly language programming.

(ii) The MDT after macro processing.

(iii) The MNT after macro processing.

```
MACRO
EXPO    &EXP
CLA     &N
ETA     &EXP
AIF     (&N EQ 1). STOP
SR      0 , 2
ETA     &N - 1
EXPO    &N
ANOP
MEND

START
USING * , 15
L       2 , BASE
L       1 , BASE
SR      0 , 0
EXPO    3
ST      1 , ANS
BR      14
DS      F
DC      F' 5'
END
```

3. (a) For the following programs given below, show the contents of ESD, TXT and RLD cards. Also show the contents in GEST. Assume that these three programs are to be loaded stating at location 400 (decimal) in order

Contd.

of PGA, PGB and PGC. (Each program must start on a double word boundary)

```
PGA     START
        ENTRY   PGA1
        EXTRN   PGB,PGC,PGC2
        DC      A(PGA), A(PGB + 4)
PGA1    DC      A(PGA1–PGA),A(PGC2–PGC)
        END
PGB     START
        ENTRY   PGB1
        EXTRN   PGA,PGC1
PGB1    DC      A(PGC1–4), A(PGB1)
PGB2    DC      A(PGB+4), A(PGB1–PGB)
PGB3    DC      A(PGC1+PGB–PGA–16)
        END
PGC     START
        ENTRY   PGC1,PGC2
        DC      A(PGC2–PGC)
PGC1    DC      A(PGC1–4),A(* + 4)
PGC2    DC      A(PGC+PGC2–PGC1)
        END
```

10

4. (a) How source code control systems are useful while building a project ? Write SCCS command structure. 5

(b) A system of files contains four files named

add.c	→	contains a function add()
factorial.c	→	contains a function factorial()
data.dat	→	is a data file of data required by remaining files
main.c	→	displays addition of all numbers in data.dat and displays factorial of all numbers in data.dat.for this main uses functions in add.c and factorial,c

Create a makefile for this file system. 5

5. (a) What do you mean by entry point in a device driver ? Describe various operations performed by init entry point. 4

(b) Write an awk script to generate following report. Use system variables of awk. Also, Write command for awk script execution. Datafile contains attributes

Part–id, Name, and Pr

Marine Parts R Us

Main catalog

Part–id Name

101	propeller
102	trailer hitch
103	sway bar
104	fishing line
105	mirror
106	cup holder
107	cooler
108	wheel
109	transom
110	pulley
111	lock
112	boat cover
113	premium fish

Catalog has 13 parts. 6

6. (a) Generate the Interme form of the arithmetic expression :
COST=RATE*(STAR SH)+2*RATE*(START–FINISH–100);
RETURN(COST)
END;
Also show the co an optimized matrix. 5

(b) Write a LEX prog replace all non null sequences of white spaces by a single blank er. Here, pattern "ws" is specified as a series of spaces of tab s and action is specified as return or print a single space. Any tring is returned as it is. 5

OR

(c) "YACC" recogniz grammar of a program", How ? 5

Course Code : CST 302

EIQU/RW – 16/1055

Fifth Semester B. E. (Computer Science and Engineering) Examination

COMPUTER GRAPHICS AND GUI DESIGN TECHNOLOGIES

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

(1) Each question carry marks as indicated.
(2) Due credit will be given to neatness.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answers wherever necessary with the help of neat sketches..
(5) Use Graph paper whenever necessary to illustrate the answer.

1. (a) Develop an algorithm to rasterize a circle using Bresenham's circle generation algorithm in fourth quadrant and in anticlockwise direction with centre $(0, 0)$ and radius R. Hence rasterize the circle with centre as $(4, -5)$ and radius = 4.

(b) Solve any **one** :— 6

(i) Write steps required to draw a line from point $(x1, y1)$ to $(x2, y2)$ using Bresenham's line drawing algorithm. Apply the Bresenham's algorithm to find out the pixels which are turned on for the line segment $(4, 4)$ and $(-3, 0)$. 4

(ii) Define the term Refresh Rate and Aspect Ratio. Determine how long it would take to load a 24 bits – per – pixel frame buffer of a resolution of 1280×1024 at a transfer rate of 5 microseconds for one pixel. 4

(a) Explain the seven major groups of OpenGL API functions, with one example for each function. 4

(b) Write a program to define a polygon and move this polygon from one position to another. 3

(c) Write an OPENGL program to accomplish the following :—

(i) Define the window of size 620 by 420 and set the color of a display window to purple using RGB color.

(ii) Define the callback function to display the random lines with different and 5 pixels wide.

(iii) Define a viewport of appropriate size using setViewport() function. 3

3. (a) Fill the polygon bounded by the vertices A(1,1), B(10,1), C(10,2), D((5,3), F(3,5) and G(1,3) using

(i) Edge Fill algorithm 6

(ii) Fence Fill algorithm.

(b) Solve any one 4

(i) Explain two Antialaising techniques.

(ii) Apply seed fill algorithm to fill the polygon defined by vertices ,2), B(6,2), C(6,4), D(8,4), E(8,6), F(5, G(1,6). 4
Assume pixel as (5,4).

4. Solve Either Question OR Questions five :—

(a) Use the Subdivision algorithm to clip line P_1 (60,0) and P_2 (100, at a window lower left hand corner (50,10) an upper right corner (80,40).

(b) Reflect the (−1,0), (0,−2)(1,0) and (0,2) about the lin y=2 using rotation matrices.

(c) Perform a transformation on square with diagonally opposite vertic at [(2,2), with respect to midpoint of the diagonal with scali factor being respectively.

OR

5. (a) Write short on :—

(1) Win

Course Code : CST 303 EIQU/RW – 16 /1056

Fifth Semester B. E. (Computer Science and Engineering) Examination

SOFTWARE ENGINEERING

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) Attempt all questions.
(2) All questions carry marks as indicated against them.
(3) Due credit will be given to neatness and adequate dimensions.
(4) Assume suitable data and illustrate answers with neat sketches wherever necessary.
(5) **Mobile phones and / or electronic gadgets are prohibited in the examination hall.**
(6) Use of non – programmable calculator is permitted.

1. Attempt any **two** of the following :—

(a) "Software engineering is a layered Technology" Justify the statement in the light of IEEE definition of software engineering. 5

(b) Describe RAD model and highlight its advantages and limitations. 5

(c) Describe Boehm's spiral model for software development. Explain how it combines waterfall model and prototyping ? 5

2. Attempt any **two** of the following :—

(a) Describe the seven core principles of software engineering practice. 5

(b) Enlist the communication principles for requirements elicitation of a software project. Explain any five of them. 5

(c) Discuss in detail the W5HH principle of Barry Boehm. 5

3. Attempt any **one** of the following :—

(a) Discuss the scope of design engineering. Elaborate on any six design concepts. 10

(b) Describe the stages of pattern based software design clearly bringing out the types of design patterns and extensions to design patterns. 10

4. Attempt any **two** of the following:

(a) What do you understand by system testing ? Elaborate on any two techniques of system testing. 5

(b) With a neat schematic elaborate on the software testing strategy for conventional software architectures. Also write about the fundamental steps in software testing. 5

(c) "Debugging is a consequence of a successful testing" Comment. Elaborate on approaches to debugging proposed by Glenn Myers. 5

5. Attempt any **two** of the following:—

(a) Discuss the function point metric proposed by Albrecht. A system has 12 external inputs, 24 external outputs, 30 different external queries, manages 4 internal logical files, interfaces with 6 different legacy systems (EIFs). All of these data are complex. Among the value adjustment factors 10 are absolutely essentials, 5 remaining are moderately applicable. Compute FP for the system. 5

(b) Enlist the nine distinct measurable characteristics of an OO design proposed by Whitmire for treating software metrics for OO systems. Explain any 3 of them. 5

(c) With neat schematic elaborate on the Mc Call's software quality factors. 5

6. Attempt any **two** of the following:

(a) Discuss the guidelines for conducting formal technical reviews. 5

(b) Write about the characteristics of risk. Explain different categories of software risks. 5

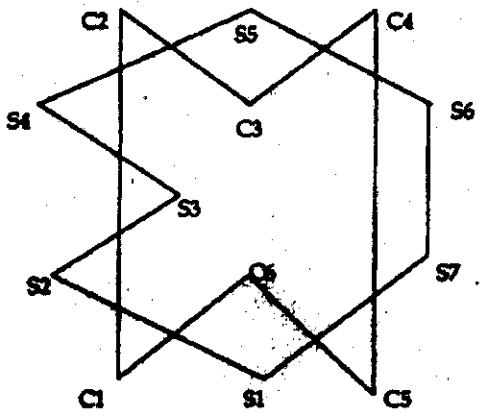
(c) Discuss the software metrics collection process. 5

(2) Viewport

(3) World co – ordinates

(4) Device co – ordinates. 2

(b) Clip a polygon using Weiler Atherton algorithm. The subject polygon is defined by S1S2S3S4S5S6S7 and the clip polygon is defined by C1C2C3C4C5C6. Show exterior as well as interior clipping.



4

(c) Find viewing transformation that maps a window whose corner are A (1,1),B(4,3),C(3,5)and D(0,3) onto a viewport which is normalized device screen. 4

6. (a) Rotate the rectangle A(0,0,0),B(2,0,0),C(2,2,0) and D(0,2,0) by 30 degree counter clockwise about the line E(0,2,2) F(1,4,6). 6

(b) Solve any **one** question :—

(i) Write a short note on color models. Distinguish between additive and subtractive color models. 4

(ii) Compare the effects of Gauraud shading with Phong shading for a polygon mesh. 4

(iii) Distinguish between one point and two point perspective projections. Consider a line segment AB with end points A(4,3,2) and B(8,3,2). Find out perspective projection of AB onto the plane $x = 0$ from centre of projection at $x = -4$. 4

7. Solve any **two** Questions :—

(a) Draw and **explain** the architecture of MPEG encoder. Compare MPEG1 and MPEG2. 5

(b) Write short **notes** :

(i) Multimedia database

(ii) Multimedia architecture 5

(c) Discuss the **LZW** compression algorithm with suitable example. Compare it with Run **length** coding and Area image compression method. 5

Course Code : CST 304

EIQU/RW–16/1057

Fifth Semester B.E. (Computer Science and Engineering) Examination

MICROPROCESSOR AND INTERFACING

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions carry marks as indicated againts them.
(2) Due credit will be given to neatness and adequate dimentions.
(3) Assume suitable data and illustrate answers with neat sketches wherever necessary.

1. (a) Explain the operation carried out with the Bus Interface Unit (BIU) of 8086. 5

(b) Explain the advantages of Segmentation of 8086 memory. 5

OR

(c) Map 64 KB of ROM with 8086, ROM chips available are 32 KB. 5

2. (a) Write an assembly language program for 8086 to transfer a block of 4 data bytes from a source block starting at 2000:2240H to a destination block starting at 3000:3340H, using string instructions. 5

OR

(b) Write an assembly language program for 8086 to find the no. of negative data words in a block, the length of the block is at 2000:2240H. The block starts at 2000:2241H, place the no. of negative data words at 2000:2230H. 5

(c) Explain the following instructions of 8086 XLAT, LOOP, SCASB 5

3. (a) Explain interrupt vecto... IVT). Why the size of IVT must be limited? 5

(b) Interface 3x3 keyboard... to wait until any k... with 8086 using 8255 and write a programme essed. 5

OR

(c) Interface 4 seven se... using suitable mode. splays and 4x8 matrix keyboard with 8279 5

4. (a) What do you mean ... 8086? Give its ad... processor system? How it is implemented by 7

(b) Clearly mention the ... is used with 8086 ... and importance of 8087 coprocessor when it 3

5. (a) State the difference ... 80386 processor cl... RISC and CISC processor. Under which category Explain in short salient features of 80386. 7

OR

(b) Explain the paging ... used in advanced ... ism of 80386 with physical address generation ocessor like in 80386 or any other. 7

(c) Explain the flag ... f 80286 microprocessor. 3

6. (a) Why internal m... banks are selecte... GPR. 8051 is divided into banks, explain how these it accessible RAM, GPR RAM, how to access 6

OR

(b) Write 8051 ALP ... is at 40H, the ... data bytes in a block; the length of the block arts at 41H; place the sum at 30H. 6

(c) Explain followi... on of 8051

(i) CJNE ... 0H, Lable

(ii) DJNZ R... 4

(iii) ADD A,...

Course Code : CST 305

EIQU/RW – 16 / 1058

Fifth Semester B. E. (Computer Science and Engineering) Examination

COMPUTER NETWORKS

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions carry marks as indicated.
(2) Internal choices are given for some questions.
(3) Explain your answer with neat sketches, wherever applicable.

1. (a) List two ways in which the OSI and TCP/IP reference model are the same. Also list two ways in which they differ. 4

(b) State and explain the significance of studying Topology. Explain any four topologies with their advatnges and disadvantages. 4

(c) Explain the difference between connection oriented and connection less service. 2

2. (a) What is the significance of the twisting in twisting pair cable. 3

(b) What are the advantages of fiber optics over copper as a transmission medium ? Is there any downside of using fiber optics over copper ? 3

(c) A noiseless 4-kHz channel is sampled every 1 msec. What is the maximum data rate ? How does the maximum data rate change if the channel is noisy, with a signal-to-noise ratio of 30 dB ?

OR

Write and explain the types of Guided Media. 4

3. (a) Draw and explain the scenario for following problem in GO back N. Consider an example of a case where the forward channel is reliable, but the reverse is not. No data frames are lost, but some ACKs are delayed

Contd.

and one is lost. After initialization there are seven sender events. Request events are triggered by data from the network layer, arrival events are triggered by acknowledgements from the physical layer. There is no time-out event here because all outstanding frames are acknowledged before the timer expires. Note that although ACK2 is lost, ACK3 serves as both ACK2 and ACK3. 3

(b) How the parity (vertical redundancy check) method is used in single bit error detection ? How this method can be modified to burst error detection ?

OR

Draw and explain HDLC frame format. 3

(c) A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$. Show the actual bit string transmitted. Suppose that the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. 4

4. (a) A group of N stations share a 56-kbps pure ALOHA channels., Each station outputs a 1000-bit frame on an average of once every 100 sec, even if the previous one has not yet been sent (e.g., the stations can buffer outgoing frames). What is the maximum values of N ? 3

(b) Sketch the Binary, Manchester and Differential Manchester encoding on a classic Ethernet for the bit stream 0001110101 3

(c) Explain the following controlled access protocols.

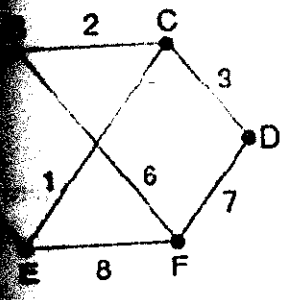
(i) Polling

(ii) Token passing

OR

Explain Hidden station and Exposed Station problem. Write an algorithm for CSMA-CA. 4

5. (a) Consider the following figure.



Contd.

Distance vector routing is used, and the following vectors have just come in to router C: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); and from E : (7, 6, 3, 9, 0, 4). The cost of the links from C to B , D and E, are 6, 3, and 5 respectively. What is C's new routing table ? Give both the outgoing line to use and the cost.

OR

Explain the significance of Optimal Routing Number in Hierarchical Routing. 3

(b) What is cause for Count to infinity problem in Distance vector routing algorithm ? 2

(c) Explain following congestion control algorithms :— 5

(i) Choke Packet.

(ii) Leaky Bucket.

6. (a) Write and Explain Berkeley Socket Primitives with respect to :—

(i) Addressing Primitives.

(ii) Server Primitives.

(iii) Client Primitives.

(b) Explain the Tomlinson's method of connection establishment. 3

(c) Explain the fields in TCP header in detail. 3

OR

Write a short note on :—

(i) Domain name system.

(ii) UDP 4