INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

INFORMATION TECHNOLOGY
TUTORIAL QUESTION BANK

Course Name	:	**MICROPROCESSORS INTERFACING AND APPLICATIONS**
Course Code	:	**AEC023**
Class	:	**B. Tech VI Semester**
Branch	:	**IT**
Regulation	:	**R16**
Year	:	**2018– 2019**
Course Coordinator	:	**Mrs. G. Bhavana, Assistant Professor, ECE**
Course Faculty	:	**Mrs. G. Bhavana, Assistant Professor, ECE**

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
	UNIT-I **OVERVIEW OF 8086 MICROPROCESSOR**		
PART-A(Short Answer Questions)			
1	Define a microprocessor by giving the power supply & clock frequency to 8085 microprocessor.	Remember	CAEC023.01
2	List out various applications of microprocessor based systems used in our daily life?	Remember	CAEC023.01
3	State the major difference between 8085 & 8086 microprocessor?	Remember	CAEC023.01
4	Describe the flag registers present in 8086 microprocessor?	Understand	CAEC023.01
5	Explain about the stack pointer and program counter present in 8086 microprocessor.	Understand	CAEC023.01
6	List out the features of 8086 microprocessor?	Remember	CAEC023.01
7	Name the functional units of 8086 microprocessor?	Remember	CAEC023.01
8	Explain the importance and functionality of an accumulator.	Understand	CAEC023.01
9	Explain why 8086 internal architecture is divided into two unit's i.e. BIU & EU.	Understand	CAEC023.01
10	Discuss about various functional units of bus interface unit present in 8086 microprocessor?	Understand	CAEC023.01

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
PART-B(Long Answer Questions)			
1	Explain about the following 8086 microprocessor pin functionality. 1. ALE 2. BHE/S7 3. DEN 4. DT/R	Understand	CAEC023.01
2	Discuss about the following 8086 microprocessor pin functionality? 1. READY 2. MN/ MX 3. HOLD 4. HOLDA	Understand	CAEC023.01
3	Describe the functionality of 8086 microprocessor with the help of a neat pin-diagram.	Remember	CAEC023.01
4	Discuss about the functionality of the following pins present in 8085 and 8086 microprocessor? a)TEST b) RQ/GT0 & RQ/GT1 c) QS0 & QS1 d) S0,S1,S2	Understand	CAEC023.01
5	Describe in detail about various interrupts used in 8086 microprocessor with the help of an example.	Understand	CAEC023.01
6	Explain in detail about arithmetic instruction set of 8086 microprocessor with the help of an example.	Understand	CAEC023.04
7	Explain various data transfer instructions of 8086 microprocessor with the following examples.	Understand	CAEC023.04
8	Discuss about the bit manipulation instructions of 8086 microprocessor with an example?	Remember	CAEC023.04
9	Explain various string manipulation instructions used in 8086 microprocessor with an example.	Understand	CAEC023.04
10	List out the assembler directives of 8086 micro processor and explain them with following examples.	Remember	CAEC023.01
11	Explain differences between RISC and CISC processors.8086 processor is RISC or CISC Processor.	Understand	CAEC023.04
12	Explain about pre-fetch Queue and Flag register of 8086 and explain what is the pre fetched Queue length and why it is limited to that length.	Understand	CAEC023.04
13	Different between 8085 & 8086 processors and draw internal architecture of 8086 and explain it with the functional blocks?	Remember	CAEC023.04
14	Explain about maximum mode operations of 8086 with neat timing diagrams.	Understand	CAEC023.04
15	Discuss about minimum mode operations of 8086 with neat timing diagrams?	Understand	CAEC023.04
PART-C(Analytical Questions)			
1	Calculate the effective address & physical address of the following instructions. (a) IMUL AX, [BP + BX – 8D] (b) SBB AL, ES:[SI + 5D] (c) PUSH AX (d) AND AH, [SI + 42D] (e) CMPSB (f) CMPB DX, [SI]. Assume CS = 5000H, DS = 8000H, SS = A000H, ES = B000H, SI= 2000H, DI = 6000H, BP = 1002H, SP = 0002H, AX = 0000H, BX = 5200H, CX = 2000H.	Understand	CAEC023.01

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2	Calculate the physical address is represented by i) 4370:561EH ii) 7A32:0028H	Understand	CAEC023.01
3	Evaluate the physical address of the top of the stack? If the stack segment register contains 3000H and the stack pointer register contains 8434H.	Understand	CAEC023.01
4	Identify the memory address of the next instruction executed by the microprocessor, when operated in the real mode, for the following CS:IP combinations: i) CS = 1000H and IP = 2000H ii) CS= 2000h and IP=10000h	Understand	CAEC023.01
5	Describe the function of the following signals. a) $\overline{\text{NMI}}$ b) $\overline{\text{LOCK}}$ c) $\overline{\text{TEST}}$ d) RESET	Understand	CAEC023.01
6	Distinguish between procedures, macros and JUMP instructions present in 8086 microprocessor?	Remember	CAEC023.01
7	Explain the following instructions. i. WAIT ii. HLT iii. ESC iv. NOP	Understand	CAEC023.01
8	Discuss the instruction format set present in 8086 and 8085 microprocessor?	Understand	CAEC023.01
9	Explain the various addressing modes used in 8086 microprocessor with proper examples.	Understand	CAEC023.01
10	Describe the operation carried out when the fallowing instructions are executed by 8086. a) MOV [SI],AX b) MOV [BX],CX c) XLAT d) MUL,BL e) DIV,BL	Remember	CAEC023.01
UNIT-II PIN DIAGRAM OF 8086 AND AEESMBLY LANGUAGE PROGRAMMING			
PART-A(Short Answer Questions)			
1	List the operating modes of 8086 microprocessor?	Remember	CAEC023.01
2	Discuss the minimum mode signals of 8086 microprocessor?	Remember	CAEC023.01
3	List the maximum mode signals of 8086 microprocessor?	Remember	CAEC023.01
4	Explain about the pins ALE, BHE/S7, DEN, DT/R present in 8086 microprocessor.	Understand	CAEC023.01
5	Explain about the pins READY, MN/MX, HOLD and HLDA present in 8086 microprocessor.	Understand	CAEC023.01
6	Define DMA with proper example.	Understand	CAEC023.07
7	Discuss about DMA operation in 8086 microprocessor.	Understand	CAEC023.07
8	Define Operating modes present in 8257microprocessor.	Remember	CAEC023.07
9	Discuss the following instructions of 8086. a) ADC b) AAS c) IMUL d) CBW	Understand	CAEC023.04
10	Give two conditional jump instructions with an example for each conditional jump?	Understand	CAEC023.04

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
PART-B(Long Answer Questions)			
1	Explain various timing diagrams present in 8086 microprocessor with proper examples.	Understand	CAEC023.04
2	List various differences between procedures and macros used in 8086 microprocessor?	Remember	CAEC023.01
3	Explain the following instructions set present in 8086 microprocessor? a) WAIT b) HLT c) ESC d) NOP	Understand	CAEC023.04
4	Differentiate between jump and loop instructions used in 8086 microprocessor?	Understand	CAEC023.04
5	Write a simple assembly language program to reverse the given string for the following numbers 1, 2, 3, 4, 5, 6?	Remember	CAEC023.05
6	Describe the functionality of 8257 Direct Memory Access Controller with neat block diagram.	Understand	CAEC023.07
7	List the types of DMA data transfer modes present in 8086 microprocessor?	Understand	CAEC023.07
8	Explain the steps to interface 8257 DMA controller with 8086 microprocessor.	Understand	CAEC023.07
9	Write an assembly language program to sort the given values in ascending order?	Remember	CAEC023.05
10	List various logical instructions available in 8086 microprocessor with an example.	Remember	CAEC023.04
11	Construct an Interface of two 4k×8 EPROMS & and two 4k×8 RAM chips with 8086. Select suitable memory map?	Understand	CAEC023.07
12	Explain how microprocessor is interfaced with 8237/8257 with a neat interfacing diagram.	Remember	CAEC023.04
13	Describe how 8086 microprocessor is interfaced with static RAM and EPROM with a neat interfacing diagram.	Remember	CAEC023.04
PART-C(Analytical Questions)			
1	Write an assembly language program to sort the given values in ascending order?	Remember	CAEC023.05
2	Give an assembly language program to display 'IARE MPMC LAB' on the screen?	Understand	CAEC023.05
3	Write an assembly language program to convert a given sixteen bit binary number to its gray equivalent?	Remember	CAEC023.05
4	Write an assembly language program to find factorial of a given number?	Remember	CAEC023.05
5	Give an assembly language program to convert a given sixteen bit binary number to its gray equivalent?	Remember	CAEC023.05
6	Write an assembly language program to insert a byte into the give array?	Remember	CAEC023.05
7	Give an assembly language program to convert ASCII to BCD?	Understand	CAEC023.05
8	Discuss about delay loop which produces a delay of 500μsec on an 8086 with 5-MHz clock?	Understand	CAEC023.05
9	Write an assembly language program to convert unpacked BCD to ASCII?	Understand	CAEC023.05
10	Give an assembly language program to find sum of squares?	Understand	CAEC023.05
UNIT-III 8255 PROGRAMMABLE PERIPHERAL INTERFACE (PPI)			
PART-A(Short Answer Questions)			
1	List out the features present in 8255 PPI (Programmable Peripheral Interface) along with its operation?	Remember	CAEC023.07
2	Write how many I/O modes of operations present in 8255 Programmable Peripheral Interface?	Remember	CAEC023.07

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
3	Write the applications of stepper motor which are used in our real time embedded systems?	Remember	CAEC023.07
4	Discuss the need for Analog to Digital Converter and Digital to Analog Converter in microprocessor applications?	Understand	CAEC023.07
5	Write the applications of Analog to Digital Converter and Digital to Analog Converter?	Remember	CAEC023.07
6	Discuss what is bit set or reset (BSR) mode in 8255?	Understand	CAEC023.07
7	Explain what is the use of Port-C signals in 8255.	Understand	CAEC023.07
8	Describe the purpose of 8255 when internal peripherals interfacing with external devices?	Remember	CAEC023.07
9	Specify the bit of a control word for the 8255 and differentiate between the I/O mode and the BSR mode?	Understand	CAEC023.07
10	List the different types of modes present in 8255 while interfacing with I/O devices?	Understand	CAEC023.07
PART-B(Long Answer Questions)			
1	Write an assembly language program to interface stepper motor with 8086 microprocessor?	Remember	CAEC023.07
2	Explain the control word format of 8255 Programmable Peripheral Interface in I/O & BSR modes.	Understand	CAEC023.07
3	Explain in detail how a display device can be interfaced with 8086 microprocessor.	Understand	CAEC023.07
4	Discuss how a 4×4 key board matrix is connected to 8255 Programmable Peripheral Interface.	Remember	CAEC023.07
5	Explain the different modes of operation present in 8255 (Programmable Peripheral Interface).	Understand	CAEC023.07
6	Draw and explain the interfacing diagram of 8255 with 8086 microprocessor?	Understand	CAEC023.07
7	Describe the architecture of 8255 Programmable Peripheral Interface and explain it with neat diagram.	Remember	CAEC023.07
8	Explain about the importance of interrupt structure in 8086 and interrupt service routine.	Understand	CAEC023.07
9	Draw and explain the pin diagram of 8255 Programmable Peripheral Interface?	Understand	CAEC023.07
10	Discuss about the importance of DOS and BIOS interrupts present in 8255 programmable peripheral interface?	Remember	CAEC023.07
PART-C(Analytical Questions)			
1	Write an assembly language Program to generate the square wave of voltage from 1V to 5V with frequency of 5 KHz. (Assume oscillator frequency of 8 MHz)?	Remember	CAEC023.05
2	Give an assembly language program to convert analog to digital using 8086?	Understand	CAEC023.05
3	Write an assembly language program to interface stepper motor with 8086 and rotate in clock wise direction with speed of 30RPM. (Assume oscillator frequency of 8 MHz)?	Remember	CAEC023.05
4	Give an assembly language Program to generate the saw tooth wave of voltage from 1V to 5V. (Assume oscillator frequency of 8MHz)?	Remember	CAEC023.05
5	Write an assembly language program to interface stepper motor with 8086 and rotate in anti clock wise direction with speed of 30RPM. (Assume oscillator frequency of 8 MHz)?	Understand	CAEC023.05
6	Write an assembly language Program to generate the triangular wave of voltage from 1V to 5V. (Assume oscillator frequency of 8MHz)?	Remember	CAEC023.05

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
7	Give an assembly language Program to interface 4×4 key board matrix with 8086 using 8055?	Remember	CAEC023.05
	MID-II		
	UNIT-III **8255 PROGRAMMABLE PERIPHERAL INTERFACE (PPI)**		
PART-A(Short Answer Questions)			
1	Draw the format of ICW1 in 8259 PIC?	Remember	CAEC023.11
2	What is the need of 8259 PIC (Programmable Interrupt Controller)?	Understand	CAEC023.07
3	Define interrupt vector table in 8255 PPI?	Remember	CAEC023.07
4	Define interrupt service routine and types of interrupt service routines in 8255 PPI?	Remember	CAEC023.07
5	Distinguish between mask able and non-mask able interrupts present in 8086 microprocessor?	Understand	CAEC023.07
6	What is meant by polling?	Remember	CAEC023.07
7	Write the priorities of 8086 interrupts?	Remember	CAEC023.07
8	List out the uses of INT-03H interrupt?	Remember	CAEC023.07
9	Explain interrupt response of an 8086 microprocessor.	Understand	CAEC023.07
10	List out the different types of interrupts present in 8086 microprocessor?	Remember	CAEC023.07
PART-B(Long Answer Questions)			
1	Explain the internal architecture of 8259 Programmable Interrupt Controller with a neat block diagram.	Understand	CAEC023.14
2	Explain the construction of interrupt vector table used in 8086 microprocessor?	Understand	CAEC023.01
3	Explain interrupt structure of 8086. What is vector table? What are the operations done during handling an interrupt service routine.	Understand	CAEC023.01
4	List different types of DOS interrupts present in 8255 programmable peripheral interface?	Remember	CAEC023.07
5	Discuss different types of BIOS interrupt present in 8255 programmable peripheral interface?	Remember	CAEC023.07
6	Give the different operating modes present in 8259 PIC microcontroller?	Understand	CAEC023.01
7	Give the different types of command words used in 8259 PIC microcontroller?	Remember	CAEC023.07
8	Describe the architecture of 8259 PIC microcontroller with neat circuit diagram?	Understand	CAEC023.07
9	Explain about the interfacing cascading of interrupt controller in PIC microcontroller.	Understand	CAEC023.07
10	Discuss the importance of cascading of interrupt controller in PIC microcontroller?	Understand	CAEC023.07
PART-C(Analytical Questions)			
1	Discuss about ICW's and OCW's of 8259 PIC microcontroller?	Remember	CAEC023.05
2	Explain about various interrupt sequence present in 8086 microprocessor system.	Understand	CAEC023.05
3	Interface 64 interrupts to the 8086 microprocessor by using 8259 programmable peripheral interface?	Remember	CAEC023.05
4	Explain about signal descriptions of 8259 programmable peripheral interface.	Understand	CAEC023.05
5	Discuss about operating modes present and its importance in 8259 PIC microcontroller?	Understand	CAEC023.05
6	Explain about the initialization sequence of 8259 with a neat flow chart and circuit diagram.	Understand	CAEC023.05

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	UNIT-IV **SERIAL DATA TRANSFER SCHEMES**		
PART-A(Short Answer Questions)			
1	Describe about communication standards present in microprocessor?	Understand	CAEC023.09
2	Define modem and explain the importance of modem in high speed serial communication?	Remember	CAEC023.09
3	Explain the types of communications present in microprocessor.	Remember	CAEC023.10
4	Define USART (Universal Synchronous Asynchronous Receiver Transmitter)?	Remember	CAEC023.12
5	Explain the use of 8251 (Universal Synchronous Asynchronous Receiver Transmitter) chip.	Remember	CAEC023.12
6	Describe the important features of 8251(Universal Synchronous Asynchronous Receiver Transmitter)?	Remember	CAEC023.12
7	List out the serial communication standards available in real time applications?	Remember	CAEC023.09
8	Discuss about the most commonly used signals in RS232?	Remember	CAEC023.09
9	Describe and sketch the frame format of mode word of 8251(Universal Synchronous Asynchronous Receiver Transmitter)?	Understand	CAEC023.09
10	Distinguish between synchronous and asynchronous serial data transmission techniques?	Understand	CAEC023.09
11	Define Baud rate and its importance in microprocessor?	Remember	CAEC023.09
12	Discuss the data transmission standards and their specifications?	Understand	CAEC023.09
13	Give the specifications of serial communication mode RS232C?	Remember	CAEC023.09
14	Explain about the following Communication standards a) Simplex b) Half Duplex c) Full Duplex	Understand	CAEC023.10
15	Describe the status register of 8251 USART (Universal Synchronous Asynchronous Receiver Transmitter).	Understand	CAEC023.12
16	Write the use of modem control unit in 8251(Universal Synchronous Asynchronous Receiver Transmitter)?	Remember	CAEC023.12
17	Discuss various types of serial communication techniques used in 8086 microprocessor?	Understand	CAEC023.12
18	Explain the interfacing of 8251 USART with 8086 microprocessor with necessary circuit diagram.	Understand	CAEC023.12
19	Explain why serial data transfer is preferred over parallel data transfer for microprocessor communication.	Understand	CAEC023.09
PART-B(Long Answer Questions)			
1	Draw the internal block diagram of 8251 USART and explain each block in detail?	Understand	CAEC023.12
2	Discuss about the pin diagram of 8251 USART (Universal Synchronous Asynchronous Receiver Transmitter)?	Remember	CAEC023.12
3	Explain about Asynchronous and synchronous serial communication with neat circuit diagrams.	Understand	CAEC023.09
4	Explain the pin structure of RS232C & also discuss about voltage & current specifications of RS 232C.	Understand	CAEC023.13
5	Draw the logic diagram to convert TTL to RS232C conversion and explain the operation in detail?	Remember	CAEC023.13
6	Describe the logic diagram to convert RS232C to TTL conversion and explain the operation?	Remember	CAEC023.13
7	Explain the about serial data transfer schemes like a) Universal Serial Bus b) IEEE-488.	Understand	CAEC023.09

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
8	Explain about Mode Instruction formats in Asynchronous and synchronous modes.	Understand	CAEC023.09
9	Explain about a) Command instruction format b) Status Read Instruction format	Understand	CAEC023.09
10	Explain about the following pins of 8251A a) Syndet/BD b) RXRDY c) CTS d) TXRDY	Remember	CAEC023.12
PART-C(Analytical Questions)			
1	Design the hardware interface circuit for interfacing 8251 USART with 8086?	Understand	CAEC023.12
2	Write an assembly language program to transmit 100 bytes of data string starting at location 2000:5000 with the following specifications. Set the 8251A in Asynchronous mode as a transmitter with even parity enabled,2 stop bits,8 bit character length, frequency 160khz and baud rate 10k?	Understand	CAEC023.05
3	Give an assembly language program to receive 100 bytes of data string store at location 3000:4000 with the following specifications. Set the 8251A in Asynchronous mode as a transmitter with even parity enabled,2 stop bits,8 bit character length, frequency 160khz and baud rate 10k?	Remember	CAEC023.05
4	Write an assembly language program to transmit and receive 1000 bytes of data string String starting at location 2000:5000H and store at 3000:4000H with the following specifications. Set the 8251A in Asynchronous mode as a transmitter with even parity enabled,2 stop bits,8 bit character length, frequency 160khz and baud rate 10k?	Understand	CAEC023.05
5	What are the functional types used in control words of 8251?	Understand	CAEC023.05
6	Explain the transmission and reception of serial data using 8251 indicating the functions of various registers in it.	Remember	CAEC023.05
7	Draw the block diagram and explain the operations of 8251 serial communication interface?	Understand	CAEC023.05
8	Explain in brief about USART.	Understand	CAEC023.05
9	Write an assembly language program to initialize 8251 and transmit 100bytes of data?	Understand	CAEC023.05
10	Give an assembly language program to initialize 8251 and receive 100bytes of data?	Remember	CAEC023.05
UNIT-V ADVANCED MICROPROCESSORS			
PART-A(Short Answer Questions)			
1	What are the salient features present in 80186 advanced microprocessor?	Understand	CAEC023.16
2	Explain in detail about the features of 80286 advanced microprocessor.	Understand	CAEC023.16
3	List the basic features of 80386 advanced microprocessor?	Remember	CAEC023.16
4	What are the basic technical features of 80486 advanced microprocessor?	Remember	CAEC023.16
5	Explain the concept of virtual memory percent in advance microprocessor.	Understand	CAEC023.16
6	Explain priorities of interrupt with an example in advance microprocessors.	Understand	CAEC023.16
7	What are the different interrupts available in 80286 advanced microprocessor?	Remember	CAEC023.16
8	What is task privilege; enlist the technical advantages of Pentium?	Remember	CAEC023.16
9	What is descriptor table and differentiate between GDT and LDT?	Understand	CAEC023.16
10	Explain LDT, GDT and IDT.	Understand	CAEC023.16
11	Compare 80286 with 8086 Microprocessor?	Remember	CAEC023.16

S. No	QUESTION	Blooms Taxonomy Level	Course Outcome
PART-B(Long Answer Questions)			
1	Explain the architecture of 80386 advanced microprocessor with neat diagram.	Understand	CAEC023.15
2	Explain the basic concepts of 80386 advanced microprocessor paging system.	Understand	CAEC023.15
3	Explain the following signal functions of 80386. a) BE_0-BE_3 b) W/R c) D/C d) ADS e) NA f) BS_{16}	Understand	CAEC023.15
4	Draw and discuss the flag register of 80386 advanced microprocessor in detail?	Understand	CAEC023.16
5	List the four major processing units in an 80286 microprocessor and briefly describe the function of each?	Remember	CAEC023.16
6	Explain in detail Register Organization present in 80286 advanced microprocessor.	Understand	CAEC023.16
7	Explain in detail various Operating Modes present in 80286 advanced microprocessor.	Understand	CAEC023.16
8	Draw neatly the Pin Diagram of 80286 advanced microprocessor and explain.	Understand	CAEC023.16
9	Explain in detail describe the about the cache memory with reference to 80486 microprocessor.	Understand	CAEC023.16
10	Explain architecture of 80486 advanced microprocessor with the help of neat diagram.	Remember	CAEC023.15
11	Discuss in brief where is the interrupt descriptor table located for the protected mode operation in 80386 microprocessor?	Remember	CAEC023.16
PART-C(Analytical Questions)			
1	Explain the memory management unit of 80286 advanced microprocessor.	Remember	CAEC023.16
2	Explain the Processor Status Word (PSW) in 80286 advanced microprocessor.	Remember	CAEC023.16
3	Discuss the following signals available in 80286. a) PEREQ b) PEACK c) CODE/INTA d) CAPs e) BUSY f) ERROR	Remember	CAEC023.16
4	Explain the physical address formation in real address mode.	Understand	CAEC023.16
5	What are the different addressing modes supported by 80286 advanced microprocessor?	Understand	CAEC023.16
6	Explain the following terms. a) Task Privilege b) Descriptor Privilege c) Selector Privilege	Remember	CAEC023.16
7	Explain the physical address formation in protected virtual address mode (PVAM).	Understand	CAEC023.16
8	Explain Descriptor tables in 80386 advanced microprocessor.	Understand	CAEC023.16
9	Explain the Page Table and Page Directory Entry with example.	Understand	CAEC023.16
10	Explain Task State Segment and Task Descriptor.	Understand	CAEC023.16

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