Basic Theory

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April 15, 2023

The Course Outline

Course Outline

- **Course Title:** Preparation course for FE examination
- **Intended Participants:** University Students who are going to take ITPEC examinations
- **Course Duration:** 60 hours

The Lecture Plan

Lecture Plan: Morning Exam, Sec 1-Basic Theory, Chapter 1-Basic Theory

Time	Learning Points/Keywords	Explanation Points	Method	Level	Note
10 minutes	Discrete mathematics	Fixed point number, Floating point number, Radix, Fraction (Mantissa), Exponent	Verbal Explanation	High	
		Logical shift, Arithmetic shift, Cancellation of significant digits, Loss of trailing digits, Overflow			
		Underflow, Union set, Product set (intersection set), Complement set, Subset, Propositional logic			
10 minutes	Applied mathematics	Factorial, Addition theorem, Multiplication theorem, Normal distribution, Poisson distribution	Verbal Explanation	Low	
		Exponential distribution, Median, Mean, Standard deviation, Variance, Correlation coefficient			
		Estimation, Regression analysisNewton's method, Absolute error, Relative error, Rounding error			
		Truncation error, Directed graph, Queue, Dynamic programming			
10 minutes	Theory of Information	Channel coding, Huffman coding, Data compression, Reverse Polish notation, Time complexity	Verbal Explanation	Medium	
		Expert system, Knowledge base, Inference engine, Neural network, Semantic analysis			
		Code generation, Intermediate language, Object program, Formal language,			
		BNF, Syntax chart, Automaton, Procedural language, Functional language, Logical language,			
10 minutes	Theory of Communications	PCM (Pulse Code Modulation), CRC, Hamming code, Parity check, ECC, Checksum		Low	
10 minutes	Theory of Measurement and	Filtering, D/A conversion, A/D conversion, Real-time OS	Verbal Explanation	Low	
		Open loop, Response characteristics, Control stability, Feedback control			

Objectives

1.1 Discrete mathematics***

- Understand and apply numeric representation that is used in a computer such as radices, conversion of radices, as well as arithmetic operations and precisions.
- Understand and apply the fundamental laws and techniques of sets and logical operations.

Keywords

1.1 Discrete mathematics***

- Fixed point number, Floating point number, Radix, Fraction (Mantissa), Exponent, Logical shift, Arithmetic shift, Cancellation of significant digits, Loss of trailing digits, Overflow, Underflow, Union set, Product set (intersection set), Complement set, Subset, Propositional logic

Objectives

1.2 Applied mathematics

- Understand and apply calculations and analysis techniques for probability and statistics.
- Understand and apply fundamental mathematical principles such as numerical analysis, graph theory, and queueing theory.

Keywords

1.2 Applied mathematics

- Factorial, Addition theorem, Multiplication theorem, Normal distribution, Poisson distribution, Exponential distribution, Median, Mean, Standard deviation, Variance, Correlation coefficient, Estimation, Regression analysis, Newton's method, Absolute error, Relative error, Rounding error, Truncation error, Directed graph, Queue, Dynamic programming

Objectives

1.3 Theory of Information**

- Understand the outline of information theory and code theory.
- Understand the outline of the theory of information including predicate logic, formal language, and automatons.
- Understand the outline of artificial intelligence.
- Understand the outline of compiler theory, programming language theory and semantics.

Keywords

1.3 Theory of Information**

- Channel coding, Huffman coding, Data compression, Reverse Polish notation, Time complexity, Expert system, Knowledge base, Inference engine, Neural network, Semantic analysis, Code generation, Intermediate language, Object program, Formal language, BNF, Syntax chart, Automaton, Procedural language, Functional language, Logical language, Object-oriented language

Objectives

1.4 Theory of Communications

- Understand and apply fundamental techniques as well as the types and characteristics of typical methods for transmitting information.

Keywords

1.4 Theory of Communications

- PCM (Pulse Code Modulation), CRC, Hamming code, Parity check, ECC, Checksum

Objectives

1.5 Theory of Measurement and Control

- Understand the fundamental mechanisms of signal processing.
- Understand the necessity and fundamental mechanisms of control.

Keywords

1.5 Theory of Measurement and Control

- Filtering, D/A conversion, A/D conversion, Real-time OS, Open loop, Response characteristics, Control stability, Feedback control

Analyzation

Analyzation

- Analyzed 24 questions
- Covered the most recent years
  - 2021 Q1 Exam
  - 2021 Q2 Exam
  - 2020 Q2 Exam

Questions

Question 1

Q1. (q1-1) Which of the following represents the hexadecimal fraction 0.C as a decimal fraction?

a. 0.12
b. 0.55
c. 0.75
d. 0.84

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Theme: Basic Theory Category: FE

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b. 0.55
c. 0.75
d. 0.84

Question 2

Q2. (q1-2) Which of the following is an appropriate description concerning radix conversion?

a. A finite fraction of a binary value is always a finite fraction after conversion to a decimal value.

b. A finite fraction of an octal value is not always a finite fraction after conversion to a binary value.

c. A finite fraction of an octal value is not always a finite fraction after conversion to a decimal value.

d. A finite fraction of a decimal value is always a finite fraction after conversion to an octal value.

Q2. (q1-2) Which of the following is an appropriate description concerning radix conversion?

Theme: Basic Theory Category: FE

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b. A finite fraction of an octal value is not always a finite fraction after conversion to a binary value.

c. A finite fraction of an octal value is not always a finite fraction after conversion to a decimal value.

d. A finite fraction of a decimal value is always a finite fraction after conversion to an octal value.

Question 2: Answer Explanation: Slide I

This question deals with binary, octal, and decimal values. First, concerning binary and octal values, $2^3 = 8$ means that a binary value can be split into blocks of three digits and substituted for an octal value. This also means that the notations for octal and binary values are compatible. For this reason, in a radix conversion between a binary value and an octal value, there are no phenomena where a finite fraction becomes an infinite fraction or vice versa. Thus, whether or not the result of a radix conversion becomes a finite fraction or an infinite fraction only needs to be considered between a decimal value and a binary value (octal value).
(1) When a decimal value with a finite fraction is represented in binary value The examples of a finite fraction and an infinite fraction are clearly shown below.
[Example]

- $(0.5)_{10}=(0.1)_2$: Example of a finite fraction
- $(0.1)_{10}=(0.0001100110011001\ldots)_2$: Example of an infinite fraction

Question 3

Q3. (q1-3) Which of the following is an appropriate method for checking if an 8-bit unsigned value x is a multiple of 16?

a. The logical product of x and each bit of the binary value 00001111 results in all zeros.

b. The logical sum of x and each bit of the binary value 00001111 results in all zeros.

c. The logical product of x and each bit of the binary value 11110000 results in all zeros.

d. The logical sum of x and each bit of the binary value 11110000 results in all zeros

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Theme: Basic Theory Category: FE

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c. The logical product of x and each bit of the binary value 11110000 results in all zeros.
d. The logical sum of x and each bit of the binary value 11110000 results in all zeros

Question 3: Answer Explanation

For an 8-bit unsigned value, the weighting is $(2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0) = (128$ 64 32 16 8 4 2 1) from the left digit. Each of the upper four digits is a multiple of 16, so no matter which bit is one, it is a multiple of 16. The weighting of each of the lower four digits is a number of 8 or less, and if all digits are aggregated the result is 15, so if any bit is 1 then division by 16 is not possible. Thus, if the lower four bits of a binary value are all zeros, then it is a multiple of 16. In order to retrieve the lower four bits of x, the logical sum of x and a binary value with 1 in the lower four bits should be calculated. Therefore, a) is appropriate.

Question 4

Q4. (q1-4) A register stores a numeric value in binary. In this register, after the positive integer x is stored, if the operation "shift the register value two bits to the left and then add x" is performed, how many times larger than x is the resulting register value? Here, overflow does not occur.

a. 3
b. 4
c. 5
d. 6

Q4. (q1-4) A register stores a numeric value in binary. In this register, after the positive integer x is stored, if the operation "shift the register value two bits to the left and then add x" is performed, how many times larger than x is the resulting register value? Here, overflow does not occur.
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a. 3
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d. 6

Question 4: Answer Explanation: Slide I

When overflow does not occur and a binary value is shifted one bit to the left, the value becomes 2^1 =2 times the original value. If the shift is two bits, the value becomes 2^2 =4 times the original value, and if the shift is three bits, it becomes 2^3 =8 times the original value, and so fourth. This is the same as multiplication by the power of two, so if the shift is two bits to the left the value becomes four times the original value. In the conditions of the question, the original number x is added to this value. If x is added to the original value multiplied by four (4x), it becomes 5x, which shows that the value is the original value multiplied by five. Therefore, c) is correct.

- a) If x is shifted one bit to the left, it becomes 2x, and if x is then added, it becomes 3x.
- b) If x is shifted two bits to the left, it becomes 4x.
- d) If the result (i.e., 2x) of shifting x one bit to the left is added to the result (i.e., 4x) of shifting x two bits to the left, it becomes 6x.

Question 5

Q5. (q1-5) Which of the following is the absolute value of the negative value 10101110 represented in 2's complement?

a. 01010000
b. 01010001
c. 01010010
d. 01010011

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Theme: Basic Theory Category: FE

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c. 01010010
d. 01010011

Question 5: Answer Explanation

The 2's complement of a binary number is the value obtained by subtracting the binary number from a reference value (i.e., "the maximum value possible with the same number of digits as the number for which 2's complement is to be calculated" +1). When a negative number is to be represented with 2's complement, the 2's complement of the absolute value of that number is used. In this question, the number of digits is eight, so the result of subtracting the absolute value from 100000000 (the maximum value of eight digits +1) is 10101110. If the absolute value is represented as x, the relationship is as show below. 100000000 x = 10101110 (← this is the 2's complement of x) x = 100000000 10101110 x = 01010010 Therefore, c) is correct. 2's complement can also be calculated by inverting the bits and adding 1. In the same way, if the reverse operation is performed, 1 is subtracted and the bits are inverted: 10101110 1 = 10101101 → inversion: 01010010). As a result, the same value can be obtained.

Question 6

Q6. (q1-7) Among the 1-byte data with equal numbers of 0s and 1s, which of the following represents the largest unsigned binary integer as a decimal integer?

a. 120
b. 127
c. 170
d. 240

Q6. (q1-7) Among the 1-byte data with equal numbers of 0s and 1s, which of the following represents the largest unsigned binary integer as a decimal integer?

Theme: Basic Theory Category: FE

a. 120
b. 127
c. 170
d. 240

Question 7: Answer Explanation

This question considers the conversion of decimal integers to unsigned 1-byte binary integers.

- a) $(120)_{10} = (01111000)_2$
- b) $(127)_{10} = (01111111)_2$
- c) $(170)_{10} = (10101010)_2$
- d) $(240)_{10} = (11110000)_2$

When b) 127 is converted to a binary integer, the number of zero (0) bits differs from that of one (1) bits, so it not a possible answer. Thus, the binary integer with the maximum value should be chosen from a), c), and d).
Therefore, d) is correct.

Question 7

Q7. (q1-8) Which of the following is an appropriate description of the floating point format that represents a real number a as $a = \pm x \times y^z$.

a. x is the fraction, z is the exponent, and y is the radix.

b. x is the radix, z is the fraction, and y is the exponent.

c. x is the radix, z is the exponent, and y is the fraction.

d. x is the exponent, z is the radix, and y is the fraction.

Q7. (q1-8) Which of the following is an appropriate description of the floating point format that represents a real number a as $a = \pm x \times y^z$.
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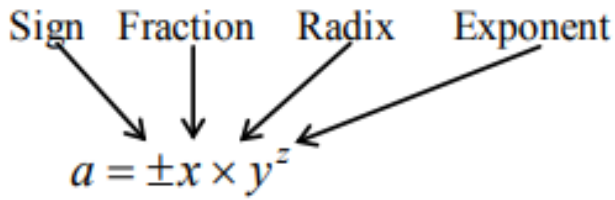
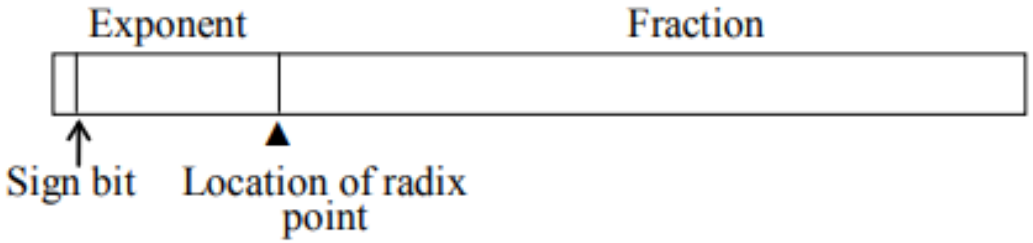
a. x is the fraction, z is the exponent, and y is the radix.
b. x is the radix, z is the fraction, and y is the exponent.
c. x is the radix, z is the exponent, and y is the fraction.
d. x is the exponent, z is the radix, and y is the fraction.

Question 8: Answer Explanation

When the real number a is represented as $a = x \times y^{z}$ with floating point representation system, the name of each part is as shown below. Therefore, a) is appropriate.



A floating point number that is represented in a data format in a computer is as shown in the figure below.



Question 8

Q8. (q1-9) In floating point arithmetic operations, when addition or subtraction is performed on a number with a large absolute value and a number with a small absolute value, which of the following refers to a phenomenon where some or all of the valid digits of the number with the small absolute value do not appear in the result?

a. Truncation error
b. Cancellation of significant digits
c. Loss of trailing digits
d. Absolute error

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a. Truncation error
b. Cancellation of significant digits
c. Loss of trailing digits
d. Absolute error

Question 8: Answer Explanation: Slide I

- The answer that applies to the question is c) loss of trailing digits. In the addition and subtraction of floating point numbers, before an operation, the values of the exponents of two numbers are adjusted to the appropriate size. In other words, the value of the exponent of the number with the smaller absolute value is adjusted to the value of the exponent of the larger value, and the fraction part of the smaller value becomes zero, which is the cause of the phenomenon. In the addition and subtraction of multiple values, in order to prevent the loss of trailing digits, addition or subtraction is performed after the values are arranged in order of absolute value from smallest to largest. By doing this, the operation is on absolute values that have a small difference, and the loss of trailing digits is unlikely to occur.
- a) Truncation error is an error that occurs in an operation such as an engineering calculation where an infinite fraction is cut off.

Question 8: Answer Explanation: Slide II

- b) Cancellation of significant digits is a phenomenon where the number of valid digits decreases due to normalization of the fraction when two numeric values with the same sign bit and almost the same absolute value are added or subtracted.
- d) Absolute error is the actual value of an error. The ratio of an error to the size of a value is called a relative error.

Question 9

Q9. (q1-14) From a bag containing four white balls and five red balls, one ball is removed and then another ball is removed without putting the first ball back into the bag. What is the probability that both balls are red?

a. $\frac{1}{6}$
b. $\frac{16}{81}$
c. $\frac{25}{81}$
d. $\frac{5}{18}$

Q9. (q1-14) From a bag containing four white balls and five red balls, one ball is removed and then another ball is removed without putting the first ball back into the bag. What is the probability that both balls are red?
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a. $\frac{1}{6}$
b. $\frac{16}{81}$
c. $\frac{25}{81}$
d. $\frac{5}{18}$

Question 9: Answer Explanation: Slide I

Probability represents the degree of certainty that a given event will occur as a numerical value. It can be calculated with the expression described below:
Probability that a given event will occur = (Number of times a given event can occur)/(Total number of events that can occur)
When one ball is removed from a bag that contains four white balls and five red balls and then another ball is removed without putting the first ball back into the bag, the probability that both balls are red is as shown below:

- **Probability that the first ball is red:**
  The number of balls in the bag is nine, of which five are red. Thus, the probability that the first ball is red is 5/9.

Question 9: Answer Explanation: Slide II

- **Probability that the second ball is red:**
  The first ball is not put back into the bag after it is removed, so the number of balls that remain in the bag is eight. As it is assumed that the first ball removed is red, the number of red balls that remain is four.

Thus, the probability is $4/8 = 1/2$. The probability that both balls are red is calculated from the product of both probabilities: $(5/9)\times(1/2) = 5/18$. Therefore, d) is correct.

Question 10

Q10. (q1-16) How many character strings with one to seven characters in length can be generated using the two characters A and B?

a. 128
b. 254
c. 255
d. 256

Q10. (q1-16) How many character strings with one to seven characters in length can be generated using the two characters A and B?
Theme: Basic Theory Category: FE

a. 128
b. 254
c. 255
d. 256

Question 10: Answer Explanation

The number of character strings with one character that can be expressed using A and B are the two variations A and B. In the same way, the number of variations for a two-character string is four: AA, AB, BA, BB. The characters that are used are the two characters A and B, so this question can be considered in the same way as binary. In the case of binary, for one digit there are 2^1 variations, for two digits there are 2^2 variations, and for n digits there are 2^n variations that can be represented. In this question, the number of variations that are possible with a length of one to seven characters is considered, and the answer is as follows:

$2^1+2^2+2^3+2^4+2^5+2^6+2^7$

$= 2+4+8+16+32+64+128 = 254$

Therefore, b) is correct.

Question 11

Q11. (q1-20) Which of the following uses a knowledge base to perform inference?

a. Expert system
b. Neural network
c. Virtual reality
d. Fuzzy computer

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Theme: Basic Theory Category: FE

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Question 11: Answer Explanation: Slide I

- A system that uses a knowledge base in a given field and can make inferences close to those made by experts in that field is called an expert system. Therefore, a) is correct.
- b) A neural network is a biological term that represents the mechanism of a brain of a living organism such as a human, but it is also used for a computer system that is modeled on this. For this reason, there are cases where the latter is definitely called an artificial neural network. Almost all current computers are designed with a so called Neumann-type architecture. These computers follow a procedure where each instruction is read from a main memory, execute each instruction, and store the result in the main memory. However, in a neural network, if the same structure as the brain of a biological organism is simulated, it is hoped that the same thought as a biological organism will be possible.

Question 11: Answer Explanation: Slide II

- c) Virtual reality is a technological field that aims to give realistic experiences to humans through realistic stimulation of the five senses such as sight and hearing. This has moved into the fields of games and training.
- d) A fuzzy computer is a computer or software with a mechanism for the representation with fuzzy logic of information that has unclear boundaries such that a fuel tank has "lots of fuel," "not much fuel," or "quite a lot of fuel."

Question 12

Q12. (q1-24) When a string contains a consecutive sequence of the same character, the repeating characters are replaced with a combination of the number of occurrences and the character in order to shorten the length of the string. Which of the following is this technique?

a. EBCDIC encoding
b. Cyclic encoding
c. Huffman encoding
d. Run length encoding

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Theme: Basic Theory Category: FE

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b. Cyclic encoding
c. Huffman encoding
d. Run length encoding

Question 12: Answer Explanation: Slide I

- The method for representing data, where the same character or the same bit pattern is repeated, in a short bit string is called run length encoding (i.e., encoding of the length of consecutive data). For example, when the character "A" is repeated 100 times, by representation of this as "100 As" rather than "AAA...AAA" the data can be compressed. Especially in monochrome fax data, there is no information except "black" and "white", and the same bit pattern is repeated often. As such, in order to reduce the amount of communication, run length encoding is used.
  Therefore, d) is correct.
- a) EBCDIC is a character code set, and is mainly used in IBM mainframes.
- b) A cyclic code is an error correction code that is attached in order to detect data errors on a transmission channel.

Question 12: Answer Explanation: Slide II

- c) Huffman coding is a method for encoding that was developed in 1952 by David Huffman. In the same way as run length encoding, Huffman coding is an encoding method that efficiently shortens character strings and the like. But, in contrast to run length encoding, which is good for repetitions of the same character or bit pattern, Huffman coding represents frequently used characters as a short bit string, and represents less frequently used characters as a long bit string. For example, in English the letters “e,” “t,” and “s” appear frequently but the letters “q” and “z” do not, so for the former letters a short code is used and for the latter letters a long code is used. By doing this, the data overall can be compressed. In actual Huffman coding, encoding is based on the frequency of occurrence of each character in the subject data.

Question 13

Q13. (2021 A FE AM-q1) What is the octal equivalent value of the hexadecimal number 7B5?

a. 735
b. 3665
c. 7551
d. 7561

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Question 14

Q14. (2021 A FE AM-q2) For a non-negative integer x, which of the following gives the remainder after division of x by 8 as a result?

a. Performing a bitwise AND operation on x and 7
b. Performing a bitwise AND operation on x and 248
c. Performing a bitwise OR operation on x and 8
d. Performing a bitwise OR operation on x and 15

Q14. (2021 A FE AM-q2) For a non-negative integer x, which of the following gives the remainder after division of x by 8 as a result?
Theme: Basic Theory Category: FE

a. Performing a bitwise AND operation on x and 7
b. Performing a bitwise AND operation on x and 248
c. Performing a bitwise OR operation on x and 8
d. Performing a bitwise OR operation on x and 15

Question 15

Q15. (2021 A FE AM-q3) For three sets A, B and C, which of the following equalities holds? Here, $\cup$ and $\cap$ the union and intersection symbols, respectively.

a. $(A \cup B) \cap (A \cap C) = B \cap (A \cup C)$
b. $(A \cup B) \cap C = (A \cup C) \cap (B \cup C)$
c. $(A \cap C) \cup (B \cap A) = (A \cap B) \cup (B \cap C)$
d. $(A \cap C) \cup (B \cap C) = (A \cup B) \cap C$

Q15. (2021 A FE AM-q3) For three sets A, B and C, which of the following equalities holds? Here, $\cup$ and $\cap$ the union and intersection symbols, respectively.

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b. $(A \cup B) \cap C = (A \cup C) \cap (B \cup C)$
c. $(A \cap C) \cup (B \cap A) = (A \cap B) \cup (B \cap C)$
d. $(A \cap C) \cup (B \cap C) = (A \cup B) \cap C$

Question 16

Q16. (2021 S FE AM-q1) Which of the following is equivalent to the logic expression below?

$$(x + y) \cdot (x + z)$$

Here, the letters are logic variables; $x + y$, $x \cdot y$, and $\bar{x}$ are OR, AND, and NOT operations on the corresponding variables, respectively.

a) $x \cdot (y + z)$

b) $x + y \cdot z$

c) $x \cdot y + y \cdot z$

d) $(\bar{x} + y) \cdot z$

Q16. (2021 S FE AM-q1) Which of the following is equivalent to the logic expression below?

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Here, the letters are logic variables; $x + y$, $x \cdot y$, and $\bar{x}$ are OR, AND, and NOT operations on the corresponding variables, respectively.

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b) $x + y \cdot z$
c) $x \cdot y + y \cdot z$
d) $(\bar{x} + y) \cdot z$

Theme: Basic Theory Category: FE

- Option b)

Question 17

Q17. (2021 S FE AM-q3)

3. The GCD (Greatest Common Divisor) of two positive integers, x_0 and x_1 ($x_0 > x_1$), is computed by the procedure below. When $x_0 = 175$ and $x_1 = 77$, how many times should step (2) of this procedure be executed before it stops? Here, "$A \leftarrow B$" indicates that B is substituted for A.

[Procedure]

(1) $i \leftarrow 2$

(2) $x_i \leftarrow$ remainder of x_{i-2} divided by x_{i-1}

(3) if $x_i = 0$, stop with x_{i-1} as the GCD

(4) $i \leftarrow i + 1$

(5) return to step (2)

a. 3

b. 4

c. 6

d. 7

Q17. (2021 S FE AM-q3)

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(5) return to step (2)

Theme: Basic Theory Category: FE

a. 3

b. 4

c. 6

d. 7

Question 18

Q18. (2021 S FE AM-q6) Which of the following is an appropriate description of parity check (vertical parity) that handles transmission errors on a communication line?

a. A parity check can correct 1-bit and 2-bit errors.

b. A parity check can detect a 1-bit error.

c. An odd parity check can detect a 1-bit error, but an even parity check cannot even detect a 1-bit error.

d. An odd parity check can detect any odd number of bit errors, and an even parity check can detect any even number of bit errors.

Q18. (2021 S FE AM-q6) Which of the following is an appropriate description of parity check (vertical parity) that handles transmission errors on a communication line?

Theme: Basic Theory Category: FE

a. A parity check can correct 1-bit and 2-bit errors.

b. A parity check can detect a 1-bit error.

c. An odd parity check can detect a 1-bit error, but an even parity check cannot even detect a 1-bit error.

d. An odd parity check can detect any odd number of bit errors, and an even parity check can detect any even number of bit errors.

Question 19

Q19. (2020 S FE AM-q3) What is the value of the postfix expression below? Here, A, B, C, and D are operands whose values are 4, 3, 5, and 6, respectively. Symbols "+", "-", "×", and "÷" are arithmetic operators for addition, subtraction, multiplication, and division, respectively.

A B 2 × + D B ÷ C × -

a. 3
b. 0
c. 3
d. 40/3

Q19. (2020 S FE AM-q3) What is the value of the postfix expression below? Here, A, B, C, and D are operands whose values are 4, 3, 5, and 6, respectively. Symbols "+", "-", "×", and "÷" are arithmetic operators for addition, subtraction, multiplication, and division, respectively.

A B 2 × + D B ÷ C × -

Theme: Basic Theory Category: FE

a. 3

b. 0

c. 3

d. 40/3

Question 19: Answer Explanation

An postfix expression (also called Reverse Polish Notation) is a single letter or an operator, preceded by two postfix strings.

- First we read expression from left to right. So, during reading the expression from left to right, push the element in the stack if it is an operand.
- If the current character is an operatorthen pop the two operands from the stack and then evaluate it.

Question 20

Q20. (2020 S FE AM-q4) In machine learning, which of the following best describes the supervised learning?

a. It helps find previously unknown features or patterns on a dataset without pre-existing labels.
b. It tries to find the best action by evaluating each result of possible actions in a specific situation.
c. It is used to get a correct answer for new input data after being trained on a dataset with answer keys.
d. It is used to make a prediction about the actions of a user by collecting and analyzing behavioral data.

Q20. (2020 S FE AM-q4) In machine learning, which of the following best describes the supervised learning?
Theme: Basic Theory Category: FE

a. It helps find previously unknown features or patterns on a dataset without pre-existing labels.
b. It tries to find the best action by evaluating each result of possible actions in a specific situation.
c. It is used to get a correct answer for new input data after being trained on a dataset with answer keys.
d. It is used to make a prediction about the actions of a user by collecting and analyzing behavioral data.

Any Questions?

References

 IT Fundamentals (New FE Textbook Vol. 1)