

Introduction to Computer Science: Class Test I

October 7, 2022. 9:15 - 10:45

Instructions: In this test paper, there are three parts of questions. Part I consists of 15 logical questions. Part II consists of 15 multiple choice questions. Part III consists of three long questions. For Part I and Part II, you need to answer all of them. For Part III, you only have to answer two of them.

Please write down your answers in the answer book by a blue ball pen, black ball pen or a pencil. However, pencil is not preferred as pencil writing could easily be erased. On the front page of your answer book, please remember to put on your name and student ID.

Dictionary, calculator, cell phone and computer are allowed to use during the exam. If you are waiting for an urgent call, please inform Professor John Sum before the examination starts.

Part I: Logical Questions

The questions in the part are logical questions. In each question, two statements **X** and **Y** are given. You need to select one of the following options for your answer.

- (a) Both statements **X** and **Y** are not true.
- (b) Statement **X** is true. Statement **Y** is not true.
- (c) Statement **X** is not true. Statement **Y** is true.
- (d) Both statements **X** and **Y** are true. But statements **X** and **Y** do not have any logical implication.
- (e) Both statements **X** and **Y** are true. Statement **X** is a cause of statement **Y** but not in reverse. In other words, the happening of the event X is a necessary condition for the happening of the event Y .
- (f) Both statements **X** and **Y** are true. Statement **Y** is a cause of statement **X** but not in reverse. In other words, the happening of the event Y is a necessary condition for the happening of the event X .

In this part, you need to answer all of them. Each question carries 2 marks.

Question 1

X: The instructor of this class is John Sum.
Y: The birthplace of John Sum is Hong Kong.

Question 2

X: The email account for assignment submission is `pfsun@nchu.edu.tw`.
Y: The email account for applying sick leave to John Sum is `pfsun@nchu.edu.tw`.

Question 3

X: Lecture notes of this class have been post on the course homepage.
Y: Student is able to download the soft copy of the textbook *Introduction to Computer Science* from the course homepage.

Question 4

X: Student must provide a proof, like medical certificate, for his/her sick leave or absent for any reason.
Y: Any student who has skipped more than three lectures without proper reasons will get 'ZERO' score in this course.

Question 5

X: Without notifying Professor John Sum in advance, student is not allowed to use computer, iPad or cell phone in the class.
Y: Student might use a computer, iPad or cell

phone accessing social network application software or checking emails during the lecture.

Question 6

X: Apple released her first personal computer with GUI controlled operating system in 1980s.

Y: Microsoft released her first GUI controlled operating system in 1980s.

Question 7

X: Vacuum tube was invented by John Ambrose Fleming in 1900s.

Y: The first generation Lyon Electronic Office (LEO) computer was made of vacuum tubes.

Question 8

X: Semiconductor transistor was invented in the late 1940s.

Y: Computers manufactured in the 1960s were made of semiconductor transistors.

Question 9

X: A software which is able to be installed and executed in a Windows-based computer must be able to be installed and executed in a MasOS-based computer.

Y: Windows and MacOS are operating systems for personal computers.

Question 10

X: The buyers who buy the Apps on the Google Play (respectively Apple Store) are the customers of Google (respectively Apple).

Y: Google Play (respectively Apple Store) is a platform for the APP developers to sell their Android (respectively iOS) Apps.

Question 11

X: A telecommunication firm is unable to provide data service to her subscriber if its telecommunication network is not connected to the Internet.

Y: The backbone infrastructure of a telecommunication firm, i.e. the telecommunication network, has been connected to the Internet via some exchange machines.

Question 12

X: A cell phone can connect to the Internet via WiFi only.

Y: A notebook computer can connect to the Internet via WiFi only.

Question 13

X: In a computer, both addition (i.e. $A + B$) and subtraction (i.e. $A - B$), where both A and B are positive integers, can be realized by using full adders only.

Y: 2's complement is a number representation format for both positive and negative integers.

Question 14

X: In US, her first electronic computer was made during the World War II.

Y: US scientists and engineers used a computer during the World War II for the design of atomic bombs.

Question 15

X: In UK, Lyon made the world first electronic computer for commercial use.

Y: In US, Remington Rand made the world first electronic computer for commercial use.

Part II: MC Questions

In this part, you need to answer all of them. Each question carries 2 marks.

Question 16

If your cell phone is unable to connect to the Internet, which of the following functions will be disabled?

- (i) Voice assistant (like Siri).
- (ii) iMessage.
- (iii) Messages.

Answer:

- (a) (i) and (ii) only.
- (b) (ii) and (iii) only.
- (c) (i) and (iii) only.
- (d) (i), (ii) and (iii).

Question 17

Once you have been making a voice call to your friend via his/her telephone number, what will you see on the top left hand corner of your phone?

Answer:

- (a) It shows 2G.
- (b) It shows 3G.
- (c) It shows 4G.
- (d) It shows 5G.

Question 18

Once have been making a LINE call to your friend, what will you see on the top left hand corner of your phone?

Answer:

- (a) It shows 2G.
- (b) It shows 3G.
- (c) It shows 4G.
- (d) It shows 5G.

Question 19

Which of the following statement(s) regarding MS WORD is(are) true?

- (i) MS WORD is a word processing software.
- (ii) MS WORD is able to check and correct any grammatical mistake.
- (iii) MS WORD is able to check and correct any spelling mistake.

Answer:

- (a) (i) only.
- (b) (ii) only.
- (c) (iii) only.
- (d) (i) and (ii) only.
- (e) (ii) and (iii) only.
- (f) (i) and (iii) only.
- (g) (i), (ii) and (iii).

Question 20

Which of the following software can be found in a Windows-based computer for editing a text document?

- (i) MS WORD.
- (ii) Wordpad.
- (iii) Notepad.

Answer:

- (a) (i) only.
- (b) (ii) only.
- (c) (iii) only.
- (d) (i) and (ii) only.
- (e) (ii) and (iii) only.
- (f) (i) and (iii) only.
- (g) (i), (ii) and (iii).

Question 21

Which of the following software will be non-functional if a computer has not been connected to the Internet?

- (i) MS WORD.
- (ii) Chrome.
- (iii) LINE of PC.

Answer:

- (a) (i) only.
- (b) (ii) only.
- (c) (iii) only.
- (d) (i) and (ii) only.
- (e) (ii) and (iii) only.
- (f) (i) and (iii) only.
- (g) (i), (ii) and (iii).

Question 22

Suppose your cell phone (with enough battery power) has been set to the following conditions but your cell phone is not able to access www.nchu.edu.tw. However, you can still make a phone call. Which of the following is likely the cause of this connection failure?

WiFi	ON
Bluetooth	OFF
Cellular	ON
Personal Hotspot	OFF
Carrier	ON

Answer:

- (a) There is no available WiFi around.
- (b) Personal Hotspot is OFF.
- (c) Bluetooth is OFF.
- (d) Web server www.nchu.edu.tw is down.

Question 23

Suppose your cell phone (with enough battery power) has been set to the following conditions.

WiFi	OFF
Bluetooth	OFF
Cellular	OFF
Personal Hotspot	OFF
Carrier	ON

What can you do with your cell phone?

Answer:

- (i) Take photo.
- (ii) Make a phone call.
- (iii) Access Internet.

Answer:

- (a) (i) and (ii) only.
- (b) (ii) and (iii) only.
- (c) (i) and (iii) only.
- (d) (i), (ii) and (iii).

Question 24

Which of the following statements are true?

- (i) To send a message to your friend via Facebook, you need to login a Facebook account.
- (ii) To watch a video on Youtube, you need to login a Google account.
- (iii) To upload a file onto a cloud platform, you need to login a user account.

Answer:

- (a) (i) only.
- (b) (ii) only.
- (c) (iii) only.
- (d) (i) and (ii) only.
- (e) (ii) and (iii) only.
- (f) (i) and (iii) only.
- (g) (i), (ii) and (iii).

Diagram for Questions 25-30

Figure 1 shows a simple digital logic circuit which consists of two logic gates only. The figure is used for answering Question 25 to Question 30.

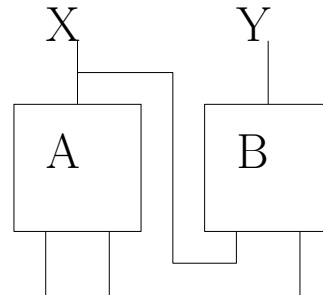


Figure 1: Simple logic circuit for Question 25 to Question 30.

Question 25

What are the output values X and Y if A is an XOR gate, B is an AND gate and the input (from left to right) is 101?

- (a) $X = 0, Y = 0$.
- (b) $X = 0, Y = 1$.
- (c) $X = 1, Y = 0$.
- (d) $X = 1, Y = 1$.

Question 26

What are the output values X and Y if A is an OR gate, B is an OR gate and the input (from left to right) is 111?

- (a) $X = 0, Y = 0$.
- (b) $X = 0, Y = 1$.
- (c) $X = 1, Y = 0$.
- (d) $X = 1, Y = 1$.

Question 27

What are the output values X and Y if A is an AND gate, B is an XOR gate and the input (from left to right) is 101?

- (a) $X = 0, Y = 0$.
- (b) $X = 0, Y = 1$.
- (c) $X = 1, Y = 0$.
- (d) $X = 1, Y = 1$.

Question 28

What are the output values X and Y if A is an OR gate, B is an NAND gate and the input (from left to right) is 111?

- (a) $X = 0, Y = 0$.
- (b) $X = 0, Y = 1$.
- (c) $X = 1, Y = 0$.
- (d) $X = 1, Y = 1$.

Question 29

What are the output values X and Y if A is an NAND gate and B is an NAND gate and the input (from left to right) is 111?

- (a) $X = 0, Y = 0$.
- (b) $X = 0, Y = 1$.
- (c) $X = 1, Y = 0$.
- (d) $X = 1, Y = 1$.

Question 30

What are the output values X and Y if A is an OR gate, B is an AND gate and the input (from left to right) is 1x1? Here, 'x' means that the second input is unknown.

- (a) $X = 0, Y = 0$.
- (b) $X = 0, Y = 1$.
- (c) $X = 1, Y = 0$.
- (d) $X = 1, Y = 1$.

Part III: Long Questions

In this part, you only need to answer two questions from Question 31 to Question 33. Each question carries 20 marks.

Question 31

In this question, there are 10 sub-questions.

- (a) State any two countries which had at least one computer for use during the World War II. [2 marks]
- (b) After World War II, Alan Turing was involved in the design of a stored-program computer based on his conceptual model introduced in 1930s. What is the name of this computer? [2 marks]
- (c) What was the cause of the death of Alan Turing in 1954? [2 marks]
- (d) After WWII, John Mauchly and J. Presper Eckert in US started a venture on making commercial computers. However, people were skeptic on this. In the BBC documentary, two skeptical reasons have been mentioned. What are they? [4 marks]
- (e) John Mauchly and J. Presper Eckert named the computer to be made the UNIVAC. What is the full name of this machine? [2 marks]
- (f) In US, Eckert-Mauchly Computer was finally sold to Remington Rand. A new division under Remington Rand was created to continue the Eckert and Mauchly computer project. What is the name of this new division? [2 marks]

- (g) What are the social effects of computers in factory and office automation? [2 marks] how do you use the pan balance to find the abnormal balls. [20 marks]
- (h) State the evolution of the methods of controlling an operating system from the fifth to the seventh generation of computers. [2 marks]
- (i) State the names of two conceptual models of computer which were proposed in the earlier 20th century. [2 marks]
- (j) Today, almost all computers their architectures follow one of these conceptual models. Which one is it? [2 marks]

Question 32

In the lecture note about *information systems*, it is stated that an information system is a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization. The mission of an information system is to improve the performance of people in organizations through the use of information technologies.

- (a) In accordance with the lecture notes on *Information Systems*, state (i) the definition of an information system and (ii) the mission of an information system. [4 marks]
- (b) Imagine that you were living in 400 years ago. (i) State three information systems which could be found at that time, (ii) describe what were they used for and (iii) state who were the owners of these information systems. [12 marks]
- (c) State the information technologies which were likely used for the realization of (i) information collection, (ii) information processing, (iii) information storage and (iv) information distribution. [4 marks]

Question 33

You are given a set of eleven balls. All of them look the same. Nine balls are normal balls each weights 2000 grams and two balls are abnormal whose weights could be either 2002 grams or 1998 grams. Clearly, human is hardly to sense the weight difference. Now, the only tool for you is a pan balance. Describe in detail, step by step,