2025

BRICS SKILLS COMPETITION

(BRICS+ FUTURE SKILLS & TECH CHALLENGE)

Internet of Things

BRICS-FS-16

Technical Description

(Online International Final)

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Contents

Module A: Internet of Things Theory

1. Single Choice

1、The wireless communication between the Internet of Things nodes is generally not affected by which of the following factors (　　).

A.Node energy　　B.Obstacle　　C.Weather　　D.Time

2、From the research status, which of the following is not a feature of cloud computing (　　).

A.Ultra-large scale　　B.Virtualization

C.Privatization　　D.High reliability

3、In the cloud computing platform, which term (　　) refers to software as a service.

A.IaaS　　B.PaaS　　C.SaaS　　D.QaaS

4、In the metering and billing aspect, the smart grid can realize the automatic metering and statistics of user's electricity consumption through the Internet of Things technology, which has a great importance to the smart grid. Because the timeliness and correctness of data metering and statistics directly affect the (　　) of power sector.

A.Safety of the power grid　　B.Quality of electricity supply

C.Level of automation　　D.Level of informatization

5、CC2530 has a total of (　　) different operational modes (power supply

modes).

A.3 B.5 C.6 D.8

6、In the field of Internet of Things, China will be in great need of making a breakthrough in the aspect of ( ) compared to foreign developed countries.

A.Sensor technology

B.Communication protocol

C.Integrated circuit technology

D.Information processing technology

7、The interrupt query is targeted to ( ).

A.Interrupt request signal

B.Interrupt flag

C.External interrupt mode control bit

D.Interrupt enable control bit

8、24-hour online real-time information interaction, real-time transactions and payments, and real-time logistics distribution without the limitation of time and space are the basic characteristics and needs of ( ).

A.Information era B.Network era

C.Internet of things era D.E era

9、As the center of “Sense China”, Wuxi City signed a cooperation agreement with ( ) on sensor network technology research and industrial development in September 2009, marking the actual construction stage of “Internet of Things”

in China.

A.Beijing University of Posts and Telecommunications

B.Nanjing University of Posts and Telecommunications

C.Peking University

D.Tsinghua University

10、The keyword of unique index in MySQL is (　　).

A.fulltext index　　B.only index　　C.index　　D.unique index

11、Which of the following descriptions on the Internet of Things is not correct: (　　)

A.GPS can also be called the Internet of Crops, but it is a primary individual application.

B.Automatic light control is the prototype of the Internet of Things

C.Remote power meter reading is the basic application of the Internet of Things

D.The Internet of Things was first called ubiquitous network in China

12、The central control system, as the (　　) of smart home, is responsible for the intelligent control of other functional subsystems.

A.“Housekeeper”　　B.“Brain”

C.“Doctor”　　D.“Security staff”

13、The data service unit of the network layer in the OSI reference model is the (　　).

A.Packet　　B.Message　　C.Frame　　D.Bit

14、Logistics is part of the (　　) process, which is the process of planning, implementation and control to meet the customer's needs for efficient and effective two-way flow and storage of goods, services and related information from the place of origin to the place of consumption.

A.Manufacturing　　B.Management

C.Finance　　D.Supply chain

15、The Internet of Things with three-layer architecture does not include (　　)

A.Sensor layer　　B.Network layer

C.Application layer　　D.Session layer

16、The disadvantages of relational databases are manifested in the following aspects: lack of effective expression of real-world entities, lack of effective processing of (　　) and lack of effective support for Web applications.

A.Complex applications　　B.Network problems

C.Complex queries　　D.Network security

17、The hexadecimal number corresponding to the binary number 110010010 can be expressed as (　　).

A.192H　　B.C90H　　C.1A2H　　D.CA0H

18、Radio frequency identification technology is a technology that enables information transfer through (　　).

A.Energy change　　B.Spatial coupling

C.Electromagnetic interaction D.Energy conversion

19、RFID cards can be divided into active tags and passive tags by ( ).

A.Power supply mode B.Operating frequency

C.Communication mode D.Tag chip

20、The decimal number 1000 corresponds to the binary number ( ).

A.1111101010 B.1111101000 C.1111101100 D.1111101110

21、Which of the following chips is used for high-frequency RFID tags ( ).

A.T5557 B.Mifare 1K C.M100 D.nRF24LE1

22、The hexadecimal number corresponding to the decimal number 127 can be expressed as ( ).

A.91 B.8A C.E9 D.7F

23、Intranet technology is mainly composed of a combination of components and technologies, and its network protocol core is ( ).

A.ISP/SPX B.PPP C.TCP/IP D.SLIP

24、Which of the following statements on the differences between sensor network and existing wireless ad hoc network is incorrect ( )

A.The number of sensor network nodes is much larger

B.Sensor network nodes are prone to failures

C.Sensor network nodes have more processing power

D.Sensor network nodes have limited storage capacity

25、Smart home, as an organic home ecosystem, mainly includes 7 major subsystems which are all based on (　　).

A.Internet　　B.Internet of Things

C.Wireless ad hoc network　　D.Wireless local area network

26、The communication system must have three basic elements, i.e. (　　).

A.Terminal, cable, and computer

B.Signal generator, communication link, and signal receiving equipment

C.Signal source, communication media, and sink

D.Terminal, communication facilities, and receiving equipment

27、Which of the following systems does not belong to the Internet of Things (　　)

A.EPC coding system

B.EPC decoding system

C.Radio Frequency Identification (RFID) technology

D.EPC information network system

28、RFID cards are read by (　　).

A.CCD or beam scanning　　B.Electromagnetic conversion

C.Wireless communication　　D.Electrical erasure, and write

29、The operating frequency of high-frequency electronic tag is (　　).

A.125-134KHz　　B.13.56MHz　　C.868-956MHz　　D.2.4-5.8GHz

30、There are two important factors to build a truly effective Internet of Things.

One is scalability the other is (　　).

A.Mobility　　B.Intelligence　　C.Real-time　　D.Reliability

31、The general framework of smart city construction generally includes: five major platforms, six centers, five types of applications, six major projects, etc. The five types of applications include: (　　), economic system, economic operation, social services and urban infrastructure operation.

A.Cultural industry　　B.E-business

C.E-government affairs　　D.Medical services

32、The circuit multiplexing is achieved by (　　) based on the differences in the carrier signal frequency.

A.Frequency division multiplexing　　B.Datagram

C.Time division multiplexing　　D.Code division multiplexing

33、Because the short-wave diffraction from obstacles is relatively poor, two devices using (　　) communication must be visible to each other, and the communication distance is generally about 1 m.

A.Bluetooth　　B.Infrared　　C.ZigBee　　D.WiFi

34、Which of the following communication technologies is not the low-power short-range wireless communication technology (　　).

A.Ultra-broadband technology　　B.LoRa

C.Bluetooth　　D.Wi-Fi

35、Radio frequency identification technology (RFID) is a kind of information

sensing technology, by which the physical entities are converted into a kind of information according to the agreed protocol, and connected to the Internet through information, thus constructing the Internet of Things. Therefore, RFID is a technology that makes entities “(　　)”.

A.Networking　　B.Communicate　　C.Improve　　D.Innovate

36、The communication between things themselves, and between things and people in the Internet of Things is carried out by (　　) method.

A.Only wired communication

B.Only wireless communication

C.Combined use of both wired and wireless communication

D.Special communication that is neither wired nor wireless

37、City is the symbol of human civilization, and the center of people’s economic, political and social life. The urbanization rate is also an important indicator for measuring the development of one country. But in the era of information technology, (　　) may be the right choice for city construction.

A.International city　　B.Smart city

C.Happy city　　D.Low-carbon city

38、What is the forward resolution of the Domain Name Service (DNS) (　　).

A.Convert a domain name to a physical address

B.Convert a domain name to an IP address

C.Convert an IP address to a physical address

D.Convert an IP address to a domain name

39、The keywords in the definition of the Internet of Things include (　　), agreed protocols, connection to the Internet and intellectualization.

A.Information sensing equipment

B.Information transmission equipment

C.Information conversion equipment

D.Information output equipment

40、ZigBee uses (　　) of CSMA-CA while reserving a dedicated time slot for communication services that require fixed bandwidth to avoid the competition and conflict of sending data, and maintain a clear channel detection.

A.Self-healing function　　B.Self-organizing function

C.Collision avoidance mechanism　　D.Data transmission mechanism

41、Which of the following statements is not related to smart grid (　　)

A.Developing a smart grid to use more electricity instead of other energy sources belongs to “low carbon” performance

B.Integrating the entire electricity system in the home into one allows an ordinary family to use “self-generated electricity”

C.The air conditioner in the home can sense the outdoor temperature, and automatically turn on/off to adjust the indoor temperature in an automatic manner

D.The goals of power grid in terms of reliability, safety, economy, efficiency, environmental friendliness and service safety are achieved through advanced sensing and measurement technologies, equipment technologies, control methods, decision support system technologies, etc.

42、What is the general reading distance of low-frequency RFID tags (　　)

A.＜ 1 m　　B.＜ 10 m　　C.100 m – 1500 m　　D.＜ 50 m

43、What is the indispensable part of sensor nodes to collect data? (　　)

A.Temperature　　B.Humidity

C.Wind direction　　D.Location information

44、www.nlecloud.com is a/an (　　).

A.IP address　　B.Domain name

C.Software Number　　D.File location

45、Wireless communication between the Internet of Things nodes is generally not affected by the following factors (　　)

A.Node energy　　B.Obstacle　　C.Weather　　D.Time

46、To set up an Ethernet network with unshielded twisted pair, you need to buy an Ethernet card with a (　　) interface.

A.RJ-45　　B.F/O　　C.AUI　　D.BNC

47、The cloud computing system launched by Microsoft in October 2008 is ( )

A.S3　　B.Google File System　　C.Azure　　D.Blue Cloud

48、Integrated Security=true in the SQL Server database connection statements refers to (　　).

A.The login method of SQL Server is SQL authentication

B.Server name is unknown

C.The login method of SQL Server is Windows authentication

D.No special meaning

49、Which of the following communication technologies is not the low-power short-range wireless communication technology (　　).

A.Broadcast　　B.Ultra-broadband technology

C.Bluetooth　　D.WIFI

50、INTEL 8051CPU is a (　　) bit microcontroller.

A.16　　B.4　　C.8　　D.Quasi-16

51、The cause of interrupt or the source of interrupt request is called the interrupt source. CC2530 has a total of (　　) interrupt sources.

A.5　　B.12　　C.16　　D.18

52、The Ministry of Industry and Information Technology clearly proposed that the sensor system must be combined with (　　) to realize the development of Internet of Things technology in China.

A.TD-SCDMA　　B.GSM　　C.CDMA2000　　D.WCDMA

53、(　　) is the lowest layer of the OSI reference model.

A.Transport layer　　B.Network layer

C.Data link layer　　D.Physical layer

54、A master Bluetooth device can communicate with a maximum of (　　) devices at the same time.

A.5　　B.6　　C.7　　D.8

55、The I/O ports P1_0 and P1_1 of CC2530 have the drive capability of ( ).

A.4mA B.8mA C.16mA D.20mA

56、High-performance computing, also known as ( ), is recognized as one of the most important scientific research fields in the 21st century and the high ground of advanced technologies in the world.

A.Supercomputing B.High-speed computing

C.Parallel computing D.Grid computing technology

57、Which of the following statements on fiber optic communication is correct ( ).

A.Light travels from one end of the optical fiber to the other by multiple reflections

B.Light always travels in a straight line in an optical fiber

C.Optical fiber is a very thin metal wire

D.Light signals travel in the optical fiber at the speed of sound

58、The decimal number 256 corresponds to the hexadecimal number ( ).

A.98 B.99 C.100 D.101

59、What is the main difference between database system and file system ( ).

A.Compared with the file system, the database system is complex

B.Compared with the database system, the file system cannot solve data

redundancy and data independence problems

C.File system can only manage program files while database system can manage various types of files

D.File system manages less data while database system can manage massive amount of data

60、The operating frequencies of RFID electronic tags are distributed in four bands: low frequency (below 135 kHz), high frequency (13.56 MHz), UHF (433 MHz/860 - 960 MHz) and microwave (2.45 GHz), and the wireless communication frequency of contactless IC card is (　　).

A.135KHz　　B.13.56MHz

C.433 MHz/860 - 960 MHz　　D.2.45 GHz

2. Multiple Choice

1、Wireless sensor network generally has weak calculation and storage abilities due to limitations by (　).

A.Transmission distance　　B.Volume

C.Cost　　D.Power supply

2、What are the development orientations for sensors? (　)

A.Microminiaturization　　B.Intelligence

C.Networking　　D.Large-scale

3、Data mining is generally divided into types of (　) data mining.

A.Instantaneity　　B.Delay

C.Predictability D.Descriptiveness

4、Which of the following statements about subquery in SQL Server are correct? ( )

A.The execution efficiency of the SQL statements with simple subquery is lower than the realization scheme with SQL variables.

B.The execution sequence of the query with subquery is subquery after parent query.

C.Table join can be generally replaced with subquery, but subquery cannot be replaced with table joint.

D.If a subquery statement returns the values of two fields, it is necessary to use the key word of [NOT] EXISTS in the where clause of where in the parent query.

5、The network layer of the Internet of Things includes ( ).

A.Access network B.Foundational bus

C.Core network D.Upper bus

6、The features of the cloud computing platform are ( ).

A.Virtualization B.Internet-based

C.Large-size concentrated computing D.Using as needed

7、Which are the modes to realize power and energy conservation? 9 ）

A.Sleeping mechanism B.Refusing communication

C.Stopping data collection D.Turning off the computing module

8、The MAC of 802.11 can be subdivided into ( ) as per different frames.

A.Control frame B.Management frame

C.Data frame D.Response frame

9、The ZigBee network devices include the following types: ( ).

A.Switch B.Network coordinator

C.Full-function devices D.Simple-function devices

10、Which of the following items are sensing equipment? ( )

A.RFID B.Infrared sensor

C.Global positioning system D.Laser scanner

11、Wireless sensor nodes are generally composed by modules such as ( ).

A.Sensing B.Computing C.Communicating D.Power supply

12、In order to terminate progress gcc (PID is 2942) in Linux, which of the following items cannot be used? ( )

A.kill -9 2942 B.kill -1 2942

C.kill -19 2942 D.kill 2942

13、Which of the following statements are incorrect descriptions on the address resolution protocol (ARP)? ( )

A.ARP is packed in the data part of the IP data

B.ARP is transmitted in a way of broadcasting

C.APR is used for conversion from IP address to domain name.

D.It is necessary to know the MAC address of the other party in order to

transmit the ARP package.

14、Which of the following technologies are supporting technologies for intelligent logistics? （ ）

A.Internet of Things information perception technology

B.Network technology

C.AI, data warehouse and data mining technologies

D.Secret technologies

15、Which of the following commands in Linux cannot check all the contents of the text file "file"? ( )

A.grep lover file B.cut -c 10-20 file

C.more file D.cat file

16、Which of the items in the sensor node positioning technologies are disadvantages of positioning with the global positioning system technology? ( )

A.Suitable for occasions of horizon communication only

B.High energy consumption, large volume and high cost

C.In need of fixed infrastructure

D.Poor practicability and weak anti-disturbance ability

17、Generally speaking, which of the following electric tags adopt the electromagnetic emission working principle? ( )

A.Low frequency B.High frequency

C.Super high frequency D.Microwave

18、The information in the Internet of Things system shows as (　).

A.Diversity

B.Huge amount of data volume

C.Complexity of data relations

D.Timeliness, accuracy and reliability required for data processing

19、Which of the following items are key technologies of Internet of Things? (　)

A.RFID technology

B.Sensor technology

C.Intelligent chip technology

D.Wireless transmission network technology

20、VLAN (virtual private network) has the characteristics of (　).

A.Controlling broadcasting data

B.Improving network performance

C.Realizing virtual working groups

D.Strengthening network security

3. True or False Choice

1、RS-485 is a type of communication protocol.　(　　)

2、There are three modes for wireless communication between machines, i.e., machine-to-machine, machine-to-mobile phone (such as remote monitoring by users) and mobile phone-to-machine (such as remote control by users). We

call this communication method as M2M for short. （ ）

3、% is a symbol of complementation. （ ）

4、In the Linux system, Shell is only a command language interpreter, which cannot be used for programming. （ ）

5、Active tags with self-contained power supply or tags with renewable energy source can send identification signals to a reader actively with the wireless transmitting module; they are mainly applied to remote electronic payment, remote identification or monitoring systems. （ ）

6、At the same time of adopting the collision detection mechanism, ZigBee also reserves special time slot for communication services in need of fixed bandwidth, to avoid competition and conflicts when sending data. （ ）

7、Similar to the nerve center and the brain of people, the application layer is in charge of transmitting and processing the information acquired by the perception layer. （ ）

8、The intelligent construction management system must take multiple integration technologies such as system integration, function integration, network integration and software interface integration as the foundation. （ ）

9、The management middleware layer of the cloud computing system structure: in charge of works such as resource management, task management, user management and security management. （ ）

10、The way to ensure no violation of personal privacy of tag owners has been a key problem for the RFID technology and the promotion of Internet of Things. （ ）

11、The mixed login mode needs both Windows authentication and SQL Server user and password authentication. （ ）

12、Error control coding can be generally divided into error detecting codes and error correcting codes. （ ）

13、The RFID technology realizes the purpose of non-contact information delivery and the purpose of automatic recognition through delivered information through space coupling based on radio frequency signals. （ ）

14、Wireless network users cannot form a self-organizing network in the no center mode except for the central structure mode of connecting to the network through base stations. （ ）

15、Cloud computing is a computing method that takes "cloud" as the center for data storage and application services. （ ）

16、There must be a suffix for any file in the Linux system. （ ）

17、Cylindrical surface is the minimum partition unit for disc partitioning. （ ）

18、Relay is a type of electric controller, which is an electric appliance that makes the controlled volume have preset step change in the electrical output circuit when the change in the input meets stipulated requirements. （ ）

19、In the Linux system, all the devices are treated as file folders; in addition, the device files of Linux are generally divided into character devices and block devices. （ ）

20、The major key of a list in a relational database can be one or more fields. （ ）

Module B: IoT device selection and configuration

1. Library System

Scene 1: Xiao Ming enters the school library and uses the access card to enter the library door. (Low frequency)

Scene 2: Xiao Ming borrowed a few books, and the librarian directly used the labels on the books to place them on the induction table to find out the information of the books. (UHF)

Scene 3: Xiao Ming uses his own library card. The administrator places the card on the sensor and finds Xiao Ming's borrowing record. (High frequency)

Use the virtual simulation experiment platform to build the above scenario. Please complete the selection and connection of the experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
UHF Card	1
Low frequency card	1
High frequency card	1
NL UHF	1
Low frequency card reader	1
High frequency card reader	1
PC Computer	1

Wiring reference:

Device Name	Port
UHF	COM
High frequency	USB3

Low frequency	USB1

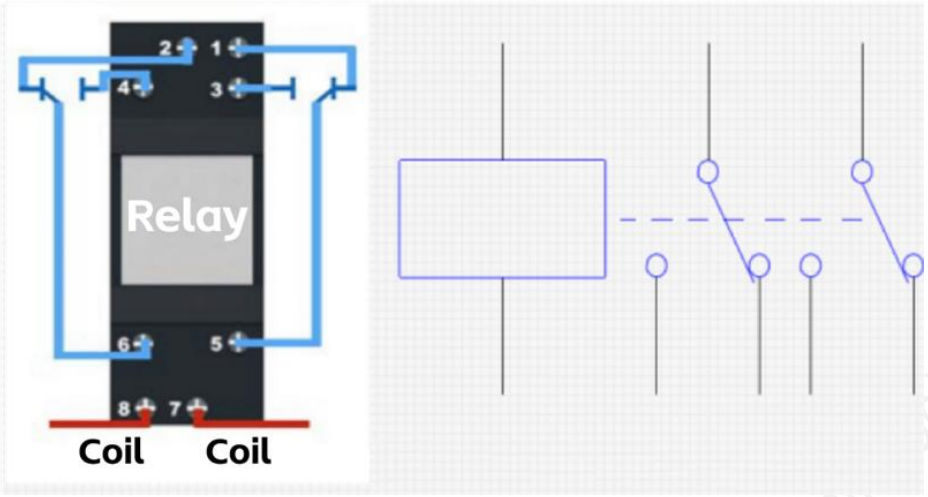
2. Fire Alarm Systems

With the continuous development of economy and technology, the number of high-rise buildings, underground buildings and large-scale comprehensive buildings in cities is increasing day by day, and the potential fire hazards are also increasing. At present, it is mainly due to human factors that fire information is missed, reported late, and alarm equipment fails to recover in time, causing the fire to spread and eventually causing immeasurable losses. Fire alarm devices are particularly important.

The automatic fire alarm system is composed of a trigger device, a fire alarm device, a linkage output device and other auxiliary function devices. In the early stage of a fire, it can convert physical quantities such as smoke, heat, flames, etc. generated by combustion into electrical signals through fire detectors, transmit them to the fire alarm controller, and at the same time notify the entire floor to evacuate in the form of sound or light. The controller records the location and time of the fire, so that people can discover the fire in time and take effective measures in time to extinguish the initial fire and minimize the loss of life and property caused by the fire.

Use the virtual simulation experiment platform to build a fire alarm system. Please complete the selection and connection of the experimental equipment according to the following equipment list and wiring parameter table.

Reference illustration:



Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
ADAM4150	1
RS485 to RS232	1
Temperature and humidity sensor (wired non-485)	1
Carbon dioxide sensor (wired non-485)	1
Flame Detector	1
Smoke detectors	1
Atomizer	1
Water Pump	1
Warning light	1
fan	1
Relay	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN0	Temperature and humidity sensor - temperature
	VIN1	Temperature and humidity sensor - humidity
	VIN2	Carbon dioxide sensor
ADAM4150	DO0	Warning light
	DO1	Atomizer

	DO2	Water Pump
	DO4	fan
	DI0	Flame sensor
	DI1	Smoke Sensor
RS485 to RS232	RS485	ADAM
	RS232	PC Computer(COM)

3. Intelligent Security System

With the accumulation of Internet of Things technology, the progress of cloud computing, big data and artificial intelligence technology, and the joint efforts of traditional home appliance manufacturers, communication manufacturers, Internet companies and smart hardware manufacturers, the domestic smart security market is rapidly heating up. Security monitoring is mainly reflected in three aspects: home monitoring, home anti-theft and fire warning:

Home monitoring: Commonly used devices are smart cameras, which are used to monitor the situation at home in real time. Users can check changes in their homes anytime and anywhere through their mobile phones. In addition to remote viewing, smart cameras also have functions such as human motion detection alarm, two-way voice, multi-user sharing, infrared night vision, and high-definition playback.

Fire warning: This type of equipment is mainly used for home fire prevention and explosion prevention. Commonly used equipment includes smoke sensors, gas leak detectors, smart switches, etc. When the smoke or combustible gas reaches a certain concentration, they will sound an alarm or automatically cut off the power supply to prevent fire, rather than letting users know after the

incident.

Home anti-theft: Anti-theft devices include human activity and door and window switch sensing devices, such as infrared intrusion detectors. When the system is in the defense state, these devices can sense someone entering and the doors and windows opening, and then sound an alarm, and promptly transmit the sensed abnormal situation to the user's mobile phone, so as to protect family members and property.

Use the virtual simulation experiment platform to build an intelligent security system. Please complete the selection and connection of experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
ADAM4150	1
RS485/RS232 Converter	1
Coordinator (wireless, non-rechargeable)	1
LED Display	1
router	1
Serial Device Server	1
Camera	1
Single relay (wireless, rechargeable)	1
Dual relay (wireless, rechargeable)	1
Carbon dioxide sensor	1
PM2.5 Sensor	1
Light sensor	1
Air Quality Sensors	1
Current and voltage transmitter	1

Microwave Sensor	1
fan	2
lamp	2

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN0	Carbon dioxide sensor
	VIN1	PM2.5
	VIN4	Light sensor
	VIN7	Air quality, current and voltage transmitters
ADAM4150	DO0	lamp
	DO1	fan
	DO2	Warning light
	DI0	Infrared radiation sensor
	DI1	Smoke Sensor
	DI2	Flame sensor
	DI3	Microwave Sensor
Coordinator (wireless, non-rechargeable)	RS232	Serial port server (P2)
LED screen	RS232	Serial port server (P4)
RS485 to RS232	RS232	Serial port server (P1)
	RS485	ADAM
Router	Etnernet1	Serial Device Server (Etnernet)
	Etnernet2	PC Computer
	Etnernet3	Camera
Single relay (wireless, rechargeable)		Atomizer
Dual relay (wireless, rechargeable)	First Links	fan
	Second Links	lamp

4. Smart Agriculture System

Smart agriculture is to make full use of the achievements of modern

information technology, integrate the application of computer and network technology, Internet of Things technology, audio and video technology, 3S technology, wireless communication technology and expert wisdom and knowledge, and realize intelligent management such as agricultural visual remote diagnosis, remote control, and disaster warning.

Use the virtual simulation experiment platform to build a smart agriculture system. Please complete the selection and connection of experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
ADAM4150	1
Serial Device Server	1
Coordinator (wireless, non-rechargeable)	1
Wind direction sensor	1
Wind speed sensor	1
Liquid level sensor	1
Water temperature sensor	1
Atmospheric pressure sensor	1
Soil temperature and humidity sensor	1
fan	1
Atomizer	1
Water Pump	1
lamp	1
Water valve controller	1
Spray	1
Smoke Detectors	1

router	1
RS485 to RS232	1
Light sensor (wireless, rechargeable)	1
Temperature and humidity sensor (wireless, rechargeable)	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN0	Wind direction sensor
	VIN1	Wind speed sensor
	VIN2	Liquid level sensor
	VIN3	Water temperature sensor
	VIN4	Atmospheric pressure sensor
	VIN5	Soil temperature and humidity (temperature)
	VIN6	Carbon dioxide sensor
	VIN7	Soil temperature and humidity (humidity)
ADAM4150	DO0	fan
	DO1	Atomizer
	DO2	Water Pump
	DO3	lamp
	DO4	Water valve controller
	DO5	Spray
	DI0	Smoke Detectors
PC Computer	Ethernet	Router (Ethernet2)
Serial Device Server	Ethernet	Router (Ethernet1)
	P2	Coordinator
Coordinator (wireless, non-rechargeable)		Light sensor (wireless, rechargeable)
		Temperature and humidity sensor (wireless, rechargeable)
RS485 to RS232	RS485	ADAM
	RS232	Serial Device Server (P1)

5. Small weather monitoring station

There are many monitoring elements in small meteorological monitoring stations, all of which are monitored through sensors.

Use the virtual simulation experiment platform to build a small meteorological monitoring station. Please complete the selection and connection of experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
Wind direction sensor	1
Wind speed sensor	1
Air Quality Sensors	1
Water temperature sensor	1
Atmospheric pressure sensor	1
Soil temperature and humidity sensor (temperature)	1
Carbon dioxide sensor	1
Soil temperature and humidity sensor (humidity)	1
NewLand Gateway	1
ADAM4017	1
ADAM4150	1
fan	1
Atomizer	1
Water Pump	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN0	Wind direction sensor
	VIN1	Wind speed sensor
	VIN2	Air Quality Sensors

	VIN3	Water temperature sensor
	VIN4	Atmospheric pressure sensor
	VIN5	Soil temperature and humidity sensor (temperature)
	VIN6	Carbon dioxide sensor
	VIN7	Soil temperature and humidity sensor (humidity)
ADAM4150	DO0	fan
	DO1	Atomizer
	DO2	Water Pump
NewLand Gateway	RS485_1_P	ADAM4150, ADAM4017
	RS485_1_N	ADAM4150, ADAM4017

Module C: Collection of IoT device data

1. Temperature and humidity monitoring system

There are many factors for indoor environmental monitoring, all of which are monitored through sensors. This system selects temperature and humidity as monitoring factors to achieve the functions required by the system.

Use the virtual simulation experiment platform to build a temperature and humidity monitoring system. Please complete the selection and connection of the experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
RS485 to RS232	1
Temperature and humidity sensor	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN0	Temperature and humidity sensor - temperature
	VIN1	Temperature and humidity sensor-humidity
RS485 to RS232	RS232	PC（COM）
	RS485	ADAM4017

Collecting data:

Download the host computer program attachment "Temperature and Humidity Monitoring System.zip", use the built "Temperature and Humidity Monitoring

System" simulation package as the data source, and follow the steps described below.

Step 1: Perform connection settings;

Step 2: Perform temperature and humidity data collection operations;

Step 3: Submit the results.

2. Access Control System

Use a low-frequency card reader to issue cards, bind personal information, and then swipe the card to pass through the access control.

Use the virtual simulation experiment platform to build the access control system. Please complete the selection and connection of the experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
Low frequency card reader	1
USB data cable	1
Low frequency card	2

Wiring reference:

Device Name	Port	Connecting Devices
PC Computer	USB1	Low frequency card reader

Collecting data:

Download the host computer program attachment "Access Control System.zip", use the built "Access Control System" simulation package as the data source, and follow the steps described below.

Step 1: Perform connection settings;

Step 2: Two low-frequency cards, one is bound to user information through card issuance, and the other low-frequency card is not issued.

Step 3: Use the issued low-frequency card to read the card to display the access control pass information.

Step 4: Use a low-frequency card that has not been issued to read the card, and the access control will show the information of failure to pass.

Step 5: Submit the results.

3. Production workshop monitoring system

Production workshop environment monitoring includes wired environment monitoring and wireless environment monitoring. The main monitoring parameters of wired environment are "water temperature" and "liquid level", and the main monitoring parameters of wireless environment are air quality.

Use virtual simulation experiment platform to realize the construction of production workshop monitoring system. Please complete the selection and connection of experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
RS485 to RS232	1
RS232 to USB	1
air quality sensor	1
liquid level sensor	1

water temperature sensor	1
Coordinator (wireless, non-rechargeable)	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN2	Liquid level sensor
	VIN3	Water temperature sensor
RS485 to 232	RS232	PC(COM)
RS232 to USB	USB	PC(USB1)
Coordinator (wireless, non-rechargeable)		Air Quality (wireless, non-rechargeable)

Collecting data:

Download the upper computer program attachment "Production Workshop Monitoring System.zip", use the built "Production Workshop Monitoring System" simulation package as the data source, and follow the steps described below.

Step 1: Perform connection settings;

Step 2: Perform data collection operations;

Step 3: Submit the results.

4. Gymnasium environment automatic control system

By monitoring the temperature, humidity, PM2.5, carbon dioxide and light in the gymnasium, setting the temperature and humidity thresholds, the fans, humidifiers, dehumidifiers, heating lamps and other equipment in the gymnasium can be automatically turned on or off to achieve the purpose of automatically regulating the gymnasium environment.

Use the virtual simulation experiment platform to build the automatic control system of the gymnasium. Please complete the selection and connection of

the experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
ADAM4150	1
RS485 to RS232	1
Carbon dioxide sensor	1
PM2.5 Sensor	1
Light sensor	1
Atomizer	1
Temperature and humidity sensor	1
fan	2
lamp	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN1	Temperature and humidity sensor-humidity
	VIN2	Temperature and humidity sensor - temperature
	VIN3	PM2.5
	VIN4	Carbon dioxide sensor
	VIN5	Light sensor
ADAM4150	DO0	Fan 1
	DO1	lamp
	DO2	Atomizer
	DO3	Fan 2
RS485 to RS232	RS232	PC Computer(COM)
	RS485	ADAM

Collecting data:

Download the upper computer program attachment "Gymnasium Automatic Control System.zip", use the built "Gymnasium Automatic Control System" simulation package as the data source, and follow the steps described below.

Step 1: Set the connection parameters and thresholds;

Step 2: Perform data collection operations;

Step 3: Automatically control the operation of the fan, bulb, and atomizer according to the sensor collection value and threshold;

Step 3: Submit the results.

5. Greenhouse farming comprehensive application system

Use the virtual simulation experiment platform to build a comprehensive application system for greenhouse farming, and realize the data collection and display of sensor equipment for wired and wireless networks. Please complete the selection and connection of experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
Coordinator (wireless, non-rechargeable)	1
Wind direction sensor	1
Wind speed sensor	1
Liquid level sensor	1
Water temperature sensor	1
Atmospheric pressure sensor	1

Soil temperature and humidity sensor	1
USB to Serial	1
RS485 to RS232	1
Light sensor (wireless, rechargeable)	1
Temperature and humidity sensor (wireless, rechargeable)	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN0	Wind direction sensor
	VIN1	Wind speed sensor
	VIN2	Liquid level sensor
	VIN3	Water temperature sensor
	VIN4	Atmospheric pressure sensor
	VIN5	Soil temperature and humidity (temperature)
	VIN6	Carbon dioxide sensor
	VIN7	Soil temperature and humidity (humidity)
Coordinator (wireless, non-rechargeable)		Light sensor (wireless, rechargeable)
		Temperature and humidity sensor (wireless, rechargeable)
USB to Serial	USB1	PC (USB)
	RS232	Coordinator
RS485 to RS232	RS232	PC(COM)
	RS485	ADAM

Collecting data:

Download the host computer program attachment "Greenhouse Farming Comprehensive Application System.zip", use the built "Greenhouse Farming Comprehensive Application System" simulation package as the data source, and follow the steps described below.

Step 1: Perform connection settings;

Step 2: Perform data collection operations;

Step 3: Submit the results.

6. Smart home integrated system

Use the virtual simulation experiment platform to build a smart home system. Please complete the selection and connection of experimental equipment according to the following equipment list and wiring parameter table.

Equipment List:

Device Name	Quantity
PC Computer	1
ADAM4017	1
ADAM4150	1
RS485 to RS232	1
Carbon dioxide sensor	1
PM2.5 Sensor	1
Oxygen Sensor	1
Flame sensor	1
Human body sensor	1
Light sensor	1
Warning light	1
Temperature and humidity sensor	1
Infrared radiation sensor	1
fan	2
lamp	1

Wiring reference:

Device Name	Port	Connecting Devices
ADAM4017	VIN7	Carbon dioxide sensor
	VIN6	Temperature and humidity sensor-humidity
	VIN5	Temperature and humidity sensor - temperature
	VIN2	PM2.5

	VIN1	Oxygen Sensor
	VIN0	Light sensor
ADAM4150	DO2	Warning light
	DO3	fan
	DI0	Human body sensor
	DI1	Flame sensor
	DI2	Infrared radiation sensor
RS485 to RS232	RS232	PC(COM)
	RS485	ADAM

Collecting data:

Download the host computer program attachment "Smart Home Integrated System.zip", use the built "Smart Home Integrated System" simulation package as the data source, and follow the steps described below.

Step 1: Perform connection settings;

Step 2: Perform data acquisition operation;

Step 3: Alarm light and fan linkage operation;

Step 4: Submit the results.