BRICS 2022 CHINA

2022 BRICS Skills Competition

(BRICS Future Skills Challenge)

TECHNICAL DESCRIPTION

Mobile Applications Development (offline)

CONTENTS

I. Project Introduction

i. Project Description

Mobile applications development refers to "application" development for mobile terminal device operating system, practitioners should be familiar with the mainstream operating system, Android operating system or IOS operating system application development kit (SDK), master the basic theory and basic skills of mobile communication and software programming, with the ability to use engineering They should be familiar with the application development kit (SDK) of the mainstream operating system, Android OS or iOS OS, master the basic theory and basic skills of mobile communication and software programming, have the ability to use engineering methods and tools to complete software coding and testing, and complete the development of App (abbreviation of Application).

The specific requirements of the professional competence of the practitioners include: preliminary design, functional development, game development, testing and delivery, etc. The practitioners are able to: understand the demands of the user , simulate the app through the product prototype design, and implement the high-fidelity UI design for the device characteristics, and use various application packages (SDK) provided by the operating system, device features (camera, GPS, gyroscope, accelerometer, Bluetooth, etc.) and server API to complete

the function development, and we need to consider the user's usage scenarios, apply basic user experience knowledge and perform relevant optimization operations. In addition, practitioners should also have other general skills, such as professional English reading ability, problem solving ability, organization and communication skills, etc.

ii. Purpose of the competition

This competition is designed around the technical development trend in the field of mobile applications development and the typical job skills in the industrial application, combining the typical job skills in the field of mobile applications development, professional construction standards and the content of the competition, aiming to examine the engineering practice ability, design ability and innovation ability of mobile applications development in the real project environment of enterprises, as well as teamwork, communication, stress resistance, professional In order to meet the development of new technologies, new modes, new business models and new applications such as "Internet+", mobile Internet, big data and artificial intelligence, and to achieve the purpose of "promoting reform through competition". In order to promote the school to better build the profession, improve the teaching quality and innovate the teaching mode.

iii. Competition Object

This competition is an individual competition and is open to anyone

aged 16-35 years old, and competitors are required to complete all competition modules within a specified time. Each team consists of 1 competitor and each team may have 1 expert.

iv. Related documents

None.

	Related requirements	weights
1	Work organization and management	5%
	The individuals need to know and understand: • Principles and practices of effective teamwork. • The principles and behaviour of the system. • How to take a proactive approach in order to identify, analyse and evaluate information from a variety of sources. • Identify multiple solutions to the problem.	
	The individuals should be able to: • Troubleshooting common App design and development issues. • Consideration of time limits and deadlines. • Debugging and error handling. • Use of computers or equipment and a range of software packages. • Apply research techniques and skills to stay current with industry guidelines. • Planning daily production schedules based on available time. • Use of a version control system (GIT). • Use of English language operating systems and software to complete work in English as required by the assignment. • A strong command of professional English vocabulary and the ability to read English.	
2	Communication and interpersonal skills	5%
	The individuals need to know and understand: • How to solve communication problems, including identifying problems, researching them, and analyzing	

	them. • Prototyping, user testing and evaluation of results. • Design concepts and techniques, including wireframing, storyboarding and creating flowcharts.	
	The individuals should be able to: • Reading comprehension rules document. • Delivering products that meet customer requirements and specifications. • Collecting, analysing and evaluating information. • Explain the criteria and requirements. • Matching client requirements. • Present a concept that meets business needs.	
3	Initial planning, design and testing framework	15%
	The individuals need to know and understand: • The behaviour of mobile application users. • The impact of functionality on mobile application products (e.g. size and various parameters). • Principles and applications of the design thinking process. • User interface (UI) design methods and user experience (UX) design methods. • Principles and applications of framework design. • Selecting the "most effective method". • The expressiveness of visual animation. • Principles and applications of flowcharts.	
	The individuals should be able to: • Complete product prototyping using Adobe XD. • Prototyping and visual design on the application user interface (UI). • Using the UI application specification for Android. • Generate standardized documentation of the application's brand identity, following the client's brand guidelines. • Plan and design marketing solutions for mobile app stores.	
4	Implementation and product development	75%
	The individuals need to know and understand: • Coding specifications and importance of mobile application code. • Systematic mechanisms for mobile platforms. • SDK architecture and its usage.	

	• Program compatibility on various end devices. • Web Services, Socket, http(s) protocol. • RESTful API design, XML and JSON data formats. • Application of analytical tools to analyse the usage of the provided APIs. • Cameras, GPS, gyroscopes. • Implementation methods for local storage. • architecture design, development, testing, tuning and other techniques and the use of related tools. • Basic principles of object-oriented design and common design patterns. • Analysis and processing of data. • Common data structures and their algorithms. • Problems with system and smart terminal prompts.	
	The individuals should be able to: • Use of development tool software to complete development requirements. • Development using APIs for integration with existing code. • Programming user interaction effects, animations and data interactions. • Creating modular and reusable development code. • Conducting frequent testing to ensure effective development. • Documenting test results and resolving problems. • Acquire skills in document manipulation and processing. • Debugging mobile applications to identify problems and writing normalized code to resolve them. • Implementing the interface development of the program according to the requirements of the prototype draft. • Implement automated testing of standardized application programming interfaces.	

II. Competencies to be possessed by the contestants

III. Competition

i. Competition Module

module	Appraisal module	Time	weights
A	prototype design	2 hours	20%
B	Interface Implementation	3 hours.	25%
C	Feature Development (Mobile)	3 hours.	35%
D	Functional development (tablet)	2 hours	20%
Total time		10 hours.	

This competition will only assess Android development skills, not iOS development skills.

ii. Description of the module

1. Module A: Prototyping

The contestants were required to use prototyping tools (Adobe XD) and graphic manipulation tools (Adobe Photoshop) to design a high-fidelity prototype of the app that fit the target audience according to the client's needs.

2. Module B: Interface Implementation

The contestant uses layout techniques to construct a layout based on

the provided prototype draft of the product, combined with the requirements of the topic. The implementation process includes: the integrity of the interface construction process, the handling of interaction effects, and the production of other features.

3. Module C: Feature Development (Mobile)

The contestant will be required to implement specific functions of the app, including sending http(s) requests, returning data using the API, using mobile device features, etc., as required by the questions.

4. Module D: Feature development (tablet)

The contestant will be required to analyze tablet terminal characteristics and write Android code to complete customer requirements for large screen app development, covering technologies such as touch, drag, rotate and other event handling and gesture recognition.

iii. proposition method

The competition is a hands-on skills competition involving 4 modules: prototyping, interface implementation, functional development (mobile) and functional development (tablet), each module is scored independently, and the design and coding is done according to the requirements of the competition to finally achieve the desired effect and function.

This competition is closed-book, with assessment ideas and

proposition directions released immediately after the technical documents are published; sample questions are published 14 days before the competition. Confidential parts will be released at the official competition.

iv. proposition scheme

The competition is based on APP development, covering the main skill points involved in the process of mobile applications development, retaining the technical difficulty of enterprise mobile applications development projects as much as possible, with a focus on testing the participants' ability to design and develop apps.

IV. Scoring Rules

The scoring criteria for this item are two categories: measurement and evaluation. Any judgement that can be expressed using objective data is called measurement; any judgement that requires a subjective description is called evaluation.

i. Evaluation of the methodology

1. Evaluation score (subjective)

Judgement scoring: A group of 3 judges will score individually, calculate the average weight score, divide by 3 and multiply by the score of that sub-category to calculate the actual score. The difference between the judges' scores must be less than or equal to 1 point, otherwise the exact reason must be given and the score must be adjusted under the

supervision of the team leader or referee.

The weighting table is as follows.

Weighted score	Requirement Description
0 points	Below industry standards in all respects, including "not attempted"
1 point	Meeting industry standards
2 points.	Meets industry standards and exceeds them in some areas
3 points.	Achieving the level of excellence expected by the industry

2. Measurement score (objective)

Measurement scoring method: There are several scoring groups by module, each consisting of three or more judges. All judges in each group will agree on the actual score of the player in the module and give a single score. If the number of judges is large, another grouping pattern can be established.

3. The use of subjective versus objective assessments

Sample subjective assessment.

Weighted score	Requirement Description
0 points	This module was not implemented
1 point	Implemented part of this module, missing some functions, does not affect the overall use

2 points.	Implemented the contents of this module
3 points.	The content of this module is realized, and the design interaction is perfect, reaching the level of reaching industry excellence

Sample table of objective assessment guidelines.

types	example	highest value	correct score	Incorrect score
Full or zero points	Password box with ciphertext display function	0.50	0.50	0
Deducted from full marks	Has text box, hint box, button elements, deduct 0.5 points for each missing one	2.00	2.00	0-1.50
Add from zero points	Implemented the scroll up and down effect (0.5 points) Achieved a side-slip effect (0.5 points)	1.00	1.00	0-0.50

ii. Scoring procedure

All modules are scored for post-competition results, and competitors need to submit their work for the current module to a designated server within a specified time frame, and judges download the work from the server and score it. This process requires ensuring that the contestant's machine and the referee's machine have the same

environment, including consistent hardware, consistent software, and consistent configuration parameters.

Commit to server git repository structure.

XX_A

XX_B

XX_C

XX_D

XX is the workstation number and will only be graded for entries submitted to the server on time.

Evaluation scores and measurement scores will be judged separately, with the possibility of the same judging team being responsible for both evaluation and measurement scores, and judging will be carried out in sequence according to the practical arrangements made by the Head Judge.

The scoring process score sheet must not be altered, and any alterations will require the signatures of all team members to confirm, while each page of the score sheet for which they are involved and responsible will need to be checked and signed for at the end of any given marking session.

iii. Calculation of grades

1. Spot check and review

In order to ensure the accuracy of the results, the supervisory team

will review the results of the top 30% of all teams in the event; the rest of the results will be reviewed on a random basis, with a coverage rate of at least 15%. If the supervisory team finds any errors in the review, they must inform the referee in writing, and the referee will correct the results and sign to confirm. If the error rate of review and random check exceeds 5%, the referee team is required to review all the results.

2. Statistical score method

Events are scored using a step-by-step scoring system with a cumulative total. Scores are calculated separately between modules and errors are not passed between modules. Both the competition items and the total competition score are scored on a percentage basis.

In the event of a tie in the final scores of competitors, the ranking order will be calculated in the order of C>D>B>A modules.

iv. Composition and grouping of the panel of judges

1. judging panel

Before scoring, the judges will draw lots randomly to group the teams and eliminate the subjective will to form teams.

2. Referee's recommendation

Referees are at the disposal of the Head Judge and must be trained on site. The Head Judge groups and divides all referees, and when judging, referees judge and record the results of the competition in a fair and impartial manner, and may not help competitors with their work

assignments or personally modify competitors' entries.

3. Discipline and requirements in judging

Referees should wear badges, dress neatly, behave generously, not make loud noises, listen to the command and obey the arrangements of the head referee when entering and leaving the field of play.

Comply with confidentiality provisions and ensure the principles of openness, fairness and impartiality.

Referees and competitors are not allowed to bring in or take out any communication devices, smart devices or storage devices at the competition site; no competition information will be disclosed during the competition.

Referees should pay attention to their own safety, operate in accordance with all specifications, and not enter the competitors' work area at will during the competition.

V. Competition-related facilities and equipment

i. Competition technology platform standards

Based on software engineering thinking, the Zhong Hui Yun Qi mobile applications development platform guides students to complete APP project design in accordance with enterprise mobile applications development engineer talent standards. On the basis of the initial framework V0.1, trainees carry out requirements analysis, UI design, functional coding and product testing through hands-on project training to

realize the V1.0 version of the project. Students will improve their comprehensive mobile applications development skills through project training.

ii. Environmental requirements

List of software for players' machines.

Name	**Technical specifications**
Android Studio	4.2.2
Android SDK	28, 29, 30
AVD Pixel 2 (phone)	API 29
AVD Pixel C (tablet)	API 29
Adobe XD	37.0.32.10 or upper
Adobe Photoshop	2020
Postman	8.8.0 or upper
OkHttp	4.9.0
Git	2.32.0 or upper
JDK	8
Chrome	91.x or upper
Sourcetree	3.4.2
Offline components (Android Gradle Plugin)	\
Offline components (Google Maven Dependencies)	\

(*If not otherwise specified, all systems and software for this competition are in English, and no additional dependencies will be provided beyond those necessary to build the project.)

iii. List of equipment

1. Technology platforms

Technology platforms	presentation
Zhong Hui Yun Qi mobile applications development platform	Based on software engineering ideas, the Zhong Hui Yun Qi mobile applications development platform guides students to complete APP project design in accordance with enterprise mobile applications development engineer talent standards. Zhong Hui Yun Qi mobile applications development platform contains practical training scenarios and provides several API interfaces.

2. Hardware Specifications

categories	configure
contestant computer	Operating system: Windows 10 (64-bit) Processor: Intel 9th generation i7 and above (VT support) Memory: 32G and above Solid State Drive: 500GB or more

server	1. Rackmount servers 2.CPU configuration: 2 CPUs, 2.2GHz each, 12 cores/24 threads, 120W power consumption 3. Memory: 16GB*8 4. Hard disk: 8*600G 10K SAS 2.5-inch hot-swappable hard disk 5. Network port: 10GE*2 6. With tracks 7. Power supply: 750W dual power supply

VI. Competition Information

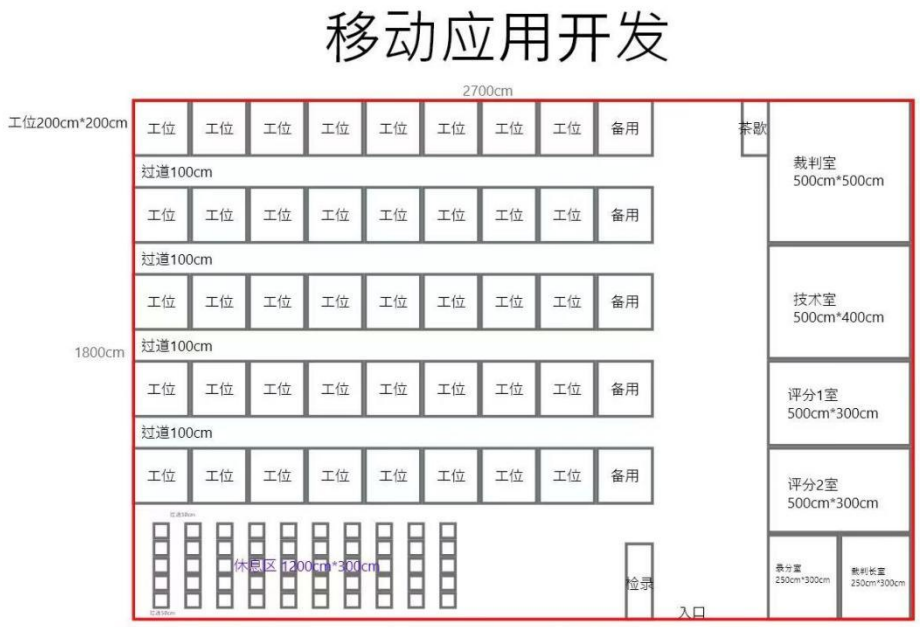
Except for the designated judges and staff, all participants of the tournament are allowed to enter the tournament grounds with the consent of the Organizing Committee or accompanied by the Organizing Committee leader and wearing the appropriate sign.

Persons allowed to enter the field may only observe the competition in the safety zone and may not use video equipment to film competitors' work stations or screens for an extended period of time.

Persons allowed to enter the course shall observe the rules of the course, shall not talk to the competitors, and shall not obstruct or interfere with their competition.

Persons allowed on the field are not allowed to smoke or make noise on the field.

VII. Course layout requirements



According to the characteristics of this event, the competition venue contains a competition area for competitors, a rest area for competitors, an area for judges, a technical support area, a scoring area, a recording area and a working area for the head judge. Each work station on the field must be captured by the live camera.

VIII. Health and Safety and Green

i. playing field

The competition venue shall be a well ventilated, bright indoor venue with a clear height of not less than 3.5m and shall be well lit

(>500lux), illuminated and ventilated.

Each competition station is marked with the competition station number, and is equipped with 1 station and 1 equipment station for equipping the competition platform and the software and hardware required for technical work, and each competition room is equipped with a workbench for placing computers, monitors, tools, etc.

Each workstation in the competition site is equipped with an operating platform and 220-volt power supply, and the cable lines in the workstation should meet safety requirements.

The competition venue is set up with a referee area and equipped with computers and other statistical tools to record the entire process of each team's competition.

A service area is set up at the competition venue to provide maintenance services, medical care, living supplies and other service support.

The technical support area provides contestants with PCs, competition backup platforms and other competition-related equipment.

ii. Security requirements

1. Racetrack personnel safety requirements.

On-site judges, competitors and staff should comply with the safety rules and requirements of the Executive Committee during the competition.

After entering the competition venue, participants must listen to and respect the management of the judges and participate in a civilized manner.

Competitors must start the competition with personal safety and equipment safety in mind, and should report any relevant safety problems to the judges immediately if they are discovered or occur.

Participants are strictly prohibited from smoking and using open fire in the race area, and carrying flammable and explosive substances.

2. Requirements for safe operation of facilities and equipment

Competitors and all participants in the event are prohibited from bringing any toxic or hazardous materials to the competition site.

The site unit shall have a dedicated security and defence team responsible for health and safety matters during the competition. The main tasks include checking the security and safety of the competition site, the participants' residence, vehicle traffic and their surroundings; developing emergency response plans; monitoring the food safety and hygiene of participants; and analysing and dealing with security emergencies.

3. Field fire safety requirements

Fire service installations, equipment and fire safety signs are all in place and functionally complete.

Personnel in key fire safety areas are working normally.

4. Safety sign posting requirements

Safety exits and evacuation routes are guaranteed to be open, safety evacuation signs and emergency lighting are intact, and the safety evacuation routes of the competition venue are prohibited from being occupied.

iii. environmental protection

The race course strictly adheres to our environmental protection laws.

All waste from the race course should be effectively sorted and disposed of and recycled wherever possible.

iv. Epidemic prevention and control

According to the relevant national and local regulations on epidemic prevention and control, do the epidemic prevention work in the pre-race centralized technical work docking, race check-in, accommodation, transportation, as well as crowd control, nucleic acid testing, body temperature testing and other aspects of the race. If the body temperature is ≥37.3℃, the participants will be guided to the temporary isolation waiting area, suspended from the competition and reported to the Executive Committee immediately, and sent to the fever clinic of the nearest designated medical institution in accordance with the epidemic prevention and control disposal process. If the medical institution determines that he/she has no problem, he/she may return to

the competition (the competition time affected by this will not be compensated).

Any participant and other personnel shall comply with the requirements of measures related to epidemic prevention work, such as: wearing masks and maintaining a safe distance throughout the race; providing their own epidemic prevention items, and disposable medical masks shall be disposed of in a special trash can after use.