SKILL TECHNICAL DESCRIPTION
Mobile Application Development

WorldSkills Russia "Young Professionals" Union (hereinafter referred to as WSR) in accordance with the charter of the organization and rules of the competition has established the following minimum requirements to this professional skill required for participation in the skill competitions.

This technical description includes the following sections:

1. INTRODUCTION

1.1. PROFESSIONAL SKILL NAME AND DESCRIPTION

1.1.1 Professional skill name: Mobile Application Development

1.1.2 Professional skill description.

Smart phones are being sold and their sales are nothing else but growing. Companies are investing increasing amounts of resources into the development of mobile technologies thanks to which consumers are able to slowly switch from being mere users to those who use mobile devices at all times and in all places: at work, at home, on vacation. This has a significant impact on mobile application development companies: the demand for mobile programmers able to perform a multitude of professional tasks is also growing at a fast rate. Whereas the number of suitable professionals on the market is very small.

The primary objective of a mobile application developer is the creation of a mobile application combining such obligatory properties as fail-safe operation on one of the mobile operating platforms (Apple iOS, Google Android, Windows Phone), user-friendly interface, multitasking functionality.

1.2. RELEVANCE AND SIGNIFICANCE OF THIS DOCUMENT

The document contains information on standards imposed on competitors in order for them to be able to participate in competitions, as well as the principles, methods and procedures which regulate the competitions. Therewith, WSR has acknowledged the WorldSkills International (WSI) copyright. Furthermore, WSR acknowledges the WSI intellectual property rights to the assessment principles, methods and procedures.

Each expert and competitor shall know and understand this Technical Description.

1.3. ASSOCIATED DOCUMENTS

Since this Technical Description contains only the information pertaining to the relevant professional skill, it must be used in association with the following documents:

- WSR, Competition Standing Orders;
- WSR, online resources referenced in this document.
- WSR, Policy and statutory regulations
- Skill-specific occupational health and safety instruction

2. WORLDSKILLS STANDARDS SPECIFICATION (WSSS)

2.1. GENERAL WORLDSKILLS STANDARDS SPECIFICATION (WSSS) INFORMATION

The WSSS determines the knowledge, understanding and specific skills that underpin best international practices of technical and professional work performance levels. It should reflect a shared global understanding of what associated work role(s) or occupation(s) represent for industry and business.

The skill competition purpose is to reflect best international practices as described by the WSSS to the extent they are able to be implemented. The WSSS is therefore a guide to the required training and preparation for the skill competition.

In skill competitions, knowledge and understanding will be checked through the assessment of the performance of practical work. There will be no separate tests of knowledge and understanding.

The WSSS is divided into clearly defined sections with numbers and headings.

Each section is assigned with a relative percentage of importance within the WSSS framework. The sum of all relative importance percentages is 100.

The Marking Scheme and the Test Project will assess only those skills that are set out in the WSSS. They will reflect the WSSS as comprehensively as possible within the constraints of the skill competition.

The marking scheme and the test project will follow the allocation of marks within the WSSS to the practically possible extent. 5 % fluctuations are allowed upon the condition they will not distort the weightings specified by the WSSS conditions.

Section		Importance (%)
1	**Work Organization and Management**	5
	A specialist shall know and understand: • Principles and skills ensuring efficient work; • Advantages of using modern development environments;	
	A specialist shall be able to: • Use provided resources for effective work; • Apply research technologies and skills to have an idea of the latest industry recommendations; • Analyze results of own activity in comparison with expectations and needs of a customer or organization.	
2	**Problem Solving, Innovativeness and Initiativity**	5
	A specialist shall know and understand: • Common types of programs that can occur in software development; • Common types of problems that can occur in a commercial organization; • Diagnostic approaches to problem solving; • Tendencies and developments in the industry, including new platforms, methods, languages, reference designations and technical skills.	
	A specialist shall be able to: • Use analytical skills to: • fuse complex or non-homogeneous information; • determine functional and non-functional specification requirements. • Use research and learning skills to: • obtain user requirements (for example, surveys, check-lists, search and analysis of documents, cooperative application development and supervision);	

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	• independent investigation of occurred problems. • Use problem solving skills to: • identify and solve problems in a timely manner; • properly collect and analyze information; • develop alternatives for decision-making, choose the most appropriate variants and implement the required decision.	
3	**Mobile Application Analysis and Design**	**30**
	A specialist shall know and understand: • Importance of taking into consideration all possible options and formation of an optimal solution based on common analytical sense and with due regard to customer's interests; • Importance of using systemic analysis and design methodologies; • Need for following new technologies and make decisions on the suitability of their application; • Importance of the system project optimization with a focus on modularity and reusability. A specialist shall be able to: • Design an application using: • application dummies and transitions; • class diagrams, sequence diagrams, status diagrams, activity diagrams; • design of a human-machine interface; • design of safety systems and control facilities • design of a layered application.	
4	**Mobile Application Development**	**30**
	A specialist shall know and understand: • Importance of taking into consideration all possible options and formation of an optimal solution based on common analytical sense and with due regard to customer's interests;	

	• Importance of using system development methodologies; • Importance of taking into consideration all normal and abnormal scenarios and work in exceptional conditions; • Importance of observing standards (for example, standards code, style guide, user interface projects); • Use of an existing code as a basis for analysis and modification; • Importance of selecting the most convenient development tool available.		
	A specialist shall be able to: • Use mobile application development technologies; • Use data base management technologies; • Use various data exchange protocol management technologies; • Build applications with a complex transition logic; • Work with standard platform services (for example: Google services, Apple); • Work with built-in data acquisition devices (gyroscope, GPS, accelerometer).		
5	**Mobile Application Testing**		**10**
	A specialist shall know and understand: • Elimination of most common software problems; • Importance of detailed solution testing; • Importance of documenting tests.		
	A specialist shall be able to: • Plan testing (for example, element testing, volume testing, complex testing, acceptance testing); • Design test cases with data and check their results; • Debug a mobile application and perform troubleshooting; • Report on the testing progress.		
	Total		**100**

3. ASSESSMENT STRATEGY AND TECHNICAL FEATURES

3.1. GENERAL REQUIREMENTS

The Strategy establishes the principles and techniques to which the WSR assessment and marking must conform.

Expert assessment is the cornerstone of WSR competitions. For this reason, it is the subject of continuous professional improvement and scrutiny. The accumulated assessment experience will determine the future use and development direction of main assessment tools used on WSR competitions: The Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment on the WSR competitions falls within one of the two categories: measurement and jury's decision. For both types of assessment, the use of explicit benchmarks against which to assess each aspect is essential to guarantee quality.

The Marking Scheme must follow the WSSS weightings. The Test Project is the assessment vehicle for the skill competition, and should also follow the WSSS. The CIS enables timely and accurate recording of marks, and has an expansive supportive capacity.

The Marking Scheme, in outline, will lead the process of Test Project design. During the further development, the Marking Scheme and the Test Project will be designed and developed through an interactive process in order to ensure joint optimization of inter-relations within the scope of the WSSS and the Assessment Strategy. They will be submitted to the Skill Competition Manager for approval together in order to demonstrate their quality and conformity with the WSSS.

4. MARKING SCHEME

4.1. GENERAL GUIDANCE

This section describes the role and place of the Marking Scheme, how the Experts will assess the competitors' work demonstrated through the Test Project performance, as well as the procedures and requirements for marking.

The Marking Scheme is the main tool of WSR competitions and defines the compliance of the Test Project assessment with the WSSS. It is intended for the allocation of points between each assessed aspect which can be related to only one WSSS module.

Through the reflection of the weightings specified in the WSSS, the Marking Scheme sets out the Test Project development parameters. Depending on the skill nature and the requirements to its assessment, it can be helpful to develop the Marking Scheme in detail early on, so it can be used as a guide for the Test Project development. Otherwise, the Test Project development shall be based on the generalized Marking Scheme. Further development of the Test Project is accompanied by the development of assessment criteria.

Section 2.1 specifies the maximum acceptable variation percentage, the Test Project Marking Schemes based on the weightings provided in the Standards Specification.

The Marking Scheme and the Test Project may be developed externally by one person, or a group of experts, or a third-party developer. Detailed and final Marking Scheme and Test Project shall be approved by the Skill Competition Manager.

Furthermore, all experts are encouraged to submit their proposals on the development of marking schemes and test projects to the Discussion Forum for their further review by the Skill Competition Manager.

In all cases, a complete marking scheme approved by the Skill Competition Manager shall be entered into the CIS at least two days prior to the competition, with the use of a standard CIS spreadsheet or other approved methods. The Chief Expert is responsible for this process.

4.2. ASSESSMENT CRITERIA

The main headings of the Marking Scheme are the assessment criteria. In some skill competitions, assessment criteria may match the WSSS section headings; in others, they may be completely different. There are usually from five to nine assessment criteria that said there should be at least three assessment criteria. Whether or not the headings match, the Marking Scheme must reflect the weightings specified in the WSSS.

The Assessment Criteria are created by the person(s) developing the Marking Scheme, who is free to define the criteria he or she considers most suited to the assessment of the Test Project performance.

The Mark Summary Form generated by the CIS will comprise a list of the assessment criteria.

The number of points allocated to each criterion will be calculated by the CIS. This will be the cumulative sum of points awarded to each aspect within that assessment criterion.

4.3. SUBCRITERIA

Each assessment criterion is divided into one or more sub criteria. Each subcriterion becomes a heading in the Marking Scheme.

Each (subcriteria) marking form is specified with a certain date on which it will be completed.

Each (subcriteria) marking form contains assessed aspects that are subject to assessment. Each assessment method is assigned with a special marking form.

4.4. ASPECTS

Each aspect describes in detail one of the assessed indicators, as well as possible marks or marking instructions.

A marking form lists in detail each marked aspect together with the number of points allocated for its assessment.

The sum of the marks allocated to each aspect must fall within the range of marks specified for each skill section in the WSSS. It will be displayed in the CIS point allocation spreadsheet in the following format:

4.5. JURY'S OPINION (JUDGEMENT SCORE)

Decisions are made using a scale of 0-3. In order to apply the scale in a clear and consistent manner, the jury must carry out a decision with due regard to:

- (criteria) comparison standards as detailed guides to each aspect
- 0-3 scale, where:
    - 0: performance does not meet the industry standard;
    - 1: performance meets the industry standard
    - 2: performance meets and, in specific respects, exceeds the industry standard;
    - 3: performance wholly exceeds the industry standard and is assessed as excellent

Each aspect is assessed by three experts; each expert must perform assessment, after which the allotted marks will be compared. If there's a discrepancy of expert assessments bigger than 1 point, the experts

shall submit the assessment of this aspect for discussion and eliminate the discrepancy.

4.6. MEASURABLE ASSESSMENT

Each aspect shall be assessed by three experts. Unless otherwise specified, only the maximum mark or zero will be awarded. If within some aspect it is possible to award marks below the maximum one, it shall be described in the Marking Scheme with the specification of measurable parameters.

5. TEST PROJECT

5.1. GENERAL REQUIREMENTS

Sections 2, 3 and 4 regulate the development of the Test Project. The recommendations in this section provide additional explanation of the TP content.

The Test Project performance shall take not less than 15 and not more than 22 hours.

In order to be qualified for the performance of the Test Project the competitors must be from 18 to 30 years old.

Regardless of the number of modules, the TP shall include the assessment of each of the WSSS sections.

The test project shall not fall outside of the WSSS.

A competitor's knowledge shall be assessed exclusively through the practical performance of the Test Project.

Knowledge of the WSR rules and regulations is not assessed during the Test Project performance.

5.2. TEST PROJECT STRUCTURE

The test project will be composed in the form of a technical assignment for the development of a mobile application including a screen transition plan, corporate style, as well as certain functional

features. The test project will include six modules within which a competitor will implement a part of functions of the entire application. Following each module, the competitors will present a working version of the application with partially implemented functionality for examination.

5.3. TEST PROJECT DEVELOPMENT REQUIREMENTS

General requirements:

•   The test project shall meet all the market requirements effective within the country;

•   The test project shall be clear, equally complex for the competitors choosing different platforms (Android/iOS/Windows Phone);

•   The test project shall be performed without third-party libraries/resources required to be downloaded from the Internet;

•   In order to check real knowledge of the competitors, the test project shall be secret and published at least 3 days prior to the competition;

•   Each module shall implement functions that can be checked separately or using the rationalized functions from the first module.

Competition workshop requirements:

The test project shall be completed in accordance with the infrastructure list of the specified competition. Arrangement of equipment and competition workstations shall correspond with the development plan approved by the receiving party.

5.4. TEST PROJECT DEVELOPMENT

The test project is developed based on the samples provided by the Skill Competition Manager on the WSR forum (http://forum.worldskills.ru). The provided Test Project samples shall be changed once a year.

5.4.1. WHO DEVELOPS TEST PROJECTS/MODULES

The Skill Competition Manager is responsible for overall management and the Test Project approval. The following individuals can be involved in the Test Project development:

- Certified WSR experts;

- Third-party developers;

- Other interested parties.

In case of the introduction of 30 % of changes into the Test Project, the following individuals participate in the process or preparation to each competition:

- Chief Expert;
- Certified skill expert (if present at the competition);
- Assessing experts (if required to be involved by the Chief Expert).

The introduced 30 % of Test Project changes shall be approved by the Skill Competition Manager in a mandatory manner.

When introducing 30 % of changes into the Test Project, the above referenced people shall be guided by the principles of objectivity and impartiality. The changes shall not affect the test project complexity or relate to other professional areas not described in the WSSS, as well as exclude any WSSS units. Furthermore, the introduced changes shall be performable using the infrastructure list approved for the competitions.

5.4.2. HOW IS THE TEST PROJECT DEVELOPED

Test projects for each competition are developed based on the unified Test Project approved by the Skill Competition Manager and posted on the Discussion Forum. Test projects can be developed both in their entirety or in modules. The Discussion Forum is the main Test Project development tool.

5.4.3. WHEN IS THE TEST PROJECT DEVELOPED

The Test Project is developed in accordance with the following schedule which defines documentation preparation periods for each competition type.

Time frames	Local competition	Qualification competition	National competition
Test Project template	The test project of the previous National Competition shall be taken from the Discussion Forum in the unmodified state.	The test project of the previous National Competition shall be taken from the Discussion Forum in the unmodified state.	It is developed based on the previous competition taking into account the skill competition execution experience and the industry standards 6 months prior to the competition
Approval of the Chief Competition Expert responsible for the TP development	2 months prior to the competition	3 months prior to the competition	4 months prior to the competition
TP publication (if applicable)	1 month prior to the competition	1 month prior to the competition	1 month prior to the competition
Introduction and approval of the Skill Competition	On Day C-2	On Day C-2	On Day C-2

Manager of 30% of changes into the TP			
Submission of proposals on the Discussion Forum on modernization of the TP, BD, IL, TD, EN, and GR	On Day C+1	On Day C+1	On Day C+1

5.5 TEST PROJECT APPROVAL

The Chief Expert and the Skill Competition Manager render a decision on the performability of all modules and if required should prove the feasibility of its performance. Time and materials shall be taken into consideration.

The test project can be approved in any form convenient for the Skill Competition Manager.

5.6. PROPERTIES OF MATERIALS AND MANUFACTURER'S INSTRUCTIONS

In case in order to perform the test project a competitor is required to become familiar with any material user manual or a manufacturer's manual, he or she will receive them in advance by the decision of the Skill Competition Manager or the Chief Expert (in the IL, or Infrastructure List). If required the familiarization / demonstration can be carried out at the competition workshop.

6. SKILL MANAGEMENT AND COMMUNICATION

6.1 DISCUSSION FORUM

All pre-competition discussions take place on the special forum (http://forum.worldskills.ru). The decisions on skill development shall only be made after a preliminary discussion on the forum. Also to take place on the forum is the notification on all important events relevant to the skill. This forum is moderated by the International Expert and (or) the Skill Competition Manager (or an expert assigned by them).

6.2. INFORMATION FOR COMPETITORS

The information for competitors is published in accordance with the Standing Orders of the carried out competition. The information can include:

- Technical description;
- Test projects;
- Mark Summary Form;
- Infrastructure List;

6.3. ARCHIVE OF TEST PROJECTS

The test projects are available at http://forum.worldskills.ru.

6.4. SKILL MANAGEMENT

General skill management is carried out by the International Expert and the Skill Competition Manager with a potential involvement of the expert community.

Skill management within a specific competition is carried out by the Chief Skill Expert in accordance with the Competition Standing Orders.

7. OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS

7.1 OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS OF THE COMPETITION

Refer to the OHSE documentation provided by the Competition Organizing Committee.

8. MATERIALS AND EQUIPMENT

8.1. INFRASTRUCTURE LIST

The infrastructure list includes all the infrastructure, equipment and expendable materials required for the Test Project performance. The Infrastructure List must contain an example of such equipment and its clear and coherent characteristics in case it is possible to obtain its equivalent.

During the development of an infrastructure list for a specific competition, the process must be guided by the Infrastructure List posted on the Discussion Forum by the Skill Competition Manager. It is mandatory for all infrastructure list changes to be agreed upon by the Skill Competition Manager.

At each competition, the Technical Expert should maintain accounting of infrastructure elements. The list should not include elements that were asked to be included by the experts or the competitors, as well as prohibited elements.

Following the competition results, if required, the Technical Expert and the Chief Expert must present the Competition Organizing Committee and the Skill Competition Manager with recommendations on the Infrastructure List changes.

8.2. MATERIALS AND EQUIPMENT PROHIBITED AT THE WORKSHOP

- The competitors can use hearing protection means.
- A competitor is not allowed to bring:
    - additional software;
    - any portable communication means, for example, mobile phones or smart watches;
    - portable digital divises (tablets, PDAs, etc.);
    - external storage units (memory cards, flash drives, etc.).
- The equipment shall not have access to built-in data storage devices. The competition organizer will make sure they were turned off.
- The expert has the right to prohibit the use of equipment brought to the competition.
- The competitors can be allowed to use Internet access at the competition venue. This will be achieved by the use of a dedicated computer; access will be limited by one 15-minute block for one competitor per session on a first-come, first-served basis. This time will be added to the competition time.

8.3. PROPOSED COMPETITION WORKSHOP LAYOUT

Competition workshop layout *(see illustration).*
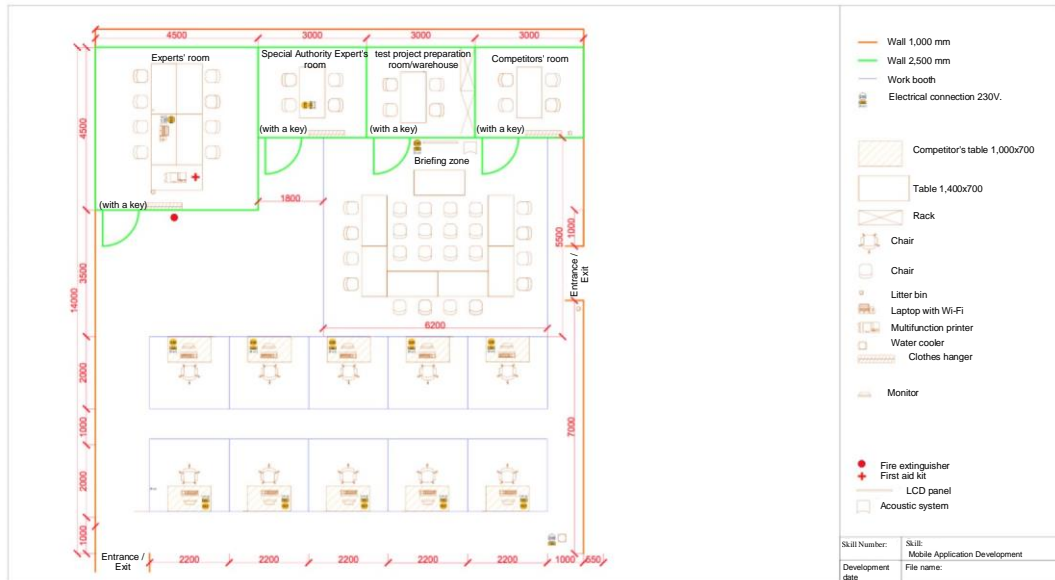
The project shall take into account the privacy of each competitor, as well as take into consideration the need for the facilitation of monitoring by the experts. If a competitor needs to call an expert, it should be obvious. The barriers between two competitors shall not be higher than 120 cm.

- The Chief Expert and the Deputy Chief Expert shall be provided with protected rooms where they can manage skills from.

- There is also a need for a well-equipped zone for the briefing of the competitors. It should be equipped with a projector, screen and public address system, so it would be easy to use a computer, audio and video equipment and other capabilities. In case it is not technically possible to provide a projector, it can be replaced by a 45-inch Full HD TV or bigger with HDMI connection access.