

# Future Skills

## **TECHNICAL DESCRIPTION**

Mobile Applications  
Development



## CONTENTS

<b>1 INTRODUCTION .....</b>	<b>3</b>
<b>2 WORLDSKILLS KAZAN 2019 STANDARDS SPECIFICATION (WSK2019SS).....</b>	<b>4</b>
<b>3 ASSESSMENT STRATEGY AND TECHNICAL FEATURES OF ASSESSMENT .....</b>	<b>8</b>
<b>4 MARKING SCHEME .....</b>	<b>9</b>
<b>5 TEST PROJECT.....</b>	<b>13</b>
<b>6 SKILL MANAGEMENT AND COMMUNICATION .....</b>	<b>16</b>
<b>7 OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS.....</b>	<b>17</b>
<b>8 MATERIALS AND EQUIPMENT .....</b>	<b>18</b>
<b>9 LIBRARIES AND DOCUMENTATION .....</b>	<b>20</b>

# 1 INTRODUCTION

## 1.1 PROFESSIONAL SKILL NAME AND DESCRIPTION

### 1.1.1 PROFESSIONAL SKILL NAME

Mobile Applications Development

### 1.1.2 PROFESSIONAL SKILL DESCRIPTION

Nowadays people do many operations with mobile device. They chat with their friends, order pizza, manage a bank account and buy food for their pet. Mobile applications are the most important tool for the development of modern technologies. Every day, people abandon the usual use of a personal computer in favor of a smartphone or tablet - this is the reason for the increase in the mobile application development market. Every year the number of vacancies and the requirements for the programmer increase.

The main task of the programmer is to develop a reliable application that allows you to simplify user interaction with familiar systems. Applications must contain a clear interface so that the user does not have problems working with small screen sizes. All interaction with external resources must be protected so that data does not fall into the hands of intruders. All applications should solve any problem of the user or have entertaining sense. The programmer must use all the capabilities of the platforms, including smart watches and smart TVs

## 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 the competition, as well as the principles, methods and procedures which regulate the competition. Therewith WSR has acknowledged the WorldSkills International (WSI) copyright. Furthermore, WSR acknowledges the WSI intellectual property rights in relation of assessment principles, methods and procedures.

Every Expert and competitor must 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 KAZAN 2019 STANDARDS SPECIFICATION (WSK2019SS)

### 2.1 GENERAL WORLDSKILLS KAZAN 2019 STANDARDS SPECIFICATION (WSK2019SS) INFORMATION

The WSK2019SS determines 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 working specialty or profession means for industry and business.

The skill competition purpose is to demonstrate best international practices as described by the WSK2019SS to the extent they are able to be implemented. The WSK2019SS 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 WSK2019SS is divided into clearly-defined sections with numbers and headings.

Each section is assigned with a relative percentage of importance within the WSK2019SS 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 WSK2019SS. They will reflect the WSK2019SS as comprehensively as possible within the constraints of the skill competition.

The marking scheme and the Test Project will reflect the allocation of marks within the WSK2019SS to the maximum possible extent. 5% fluctuations are allowed upon the condition they will not distort the weightings specified by the WSK2019SS conditions.

Section		Importance (%)
<b>1</b>	<b>Work organization and management</b>	<b>5</b>
	A specialist shall know and understand: <ul style="list-style-type: none"> <li>Principles and skills ensuring efficient work;</li> <li>Advantages of using modern development environments;</li> <li>Principles and skills team work;</li> </ul>	
	A specialist shall know how: <ul style="list-style-type: none"> <li>Use provided resources for effective work;</li> <li>Apply research technologies and skills to have an idea of the latest industry recommendations;</li> <li>Analyze results of own activity in comparison with expectations and needs of a customer or organization.</li> </ul>	

2	Communication and interpersonal relationships	5
	<p>The specialist must know and understand:</p> <ul style="list-style-type: none"> <li>• the need for discretion and confidentiality when communicating with customers;</li> <li>• the importance of resolving misunderstandings and conflict situations;</li> <li>• the importance of establishing and maintaining customer confidence and productive working relationships;</li> <li>• the importance of written and verbal communication skills;</li> <li>• how to ensure correct and understandable documentation for a software product;</li> <li>• how to prepare an accessible report and report on the results, tasks and other problems throughout the entire system development and implementation process.</li> </ul>	
	<p>The specialist should be able to:</p> <p>Use literacy skills to:</p> <ul style="list-style-type: none"> <li>• following documented instructions in the guide provided;</li> <li>• understanding of the instructions for the organization of the workplace and other technical documentation;</li> <li>• interpretation and understanding of system specifications;</li> <li>• maintaining a level of own awareness in relevant industry guidelines.</li> </ul> <p>Use oral communication skills to:</p> <ul style="list-style-type: none"> <li>• discussing and proposing a system specification;</li> <li>• regularly notifying the client of the progress of work on the system;</li> <li>• negotiating with the client regarding the budget and the timing of the project;</li> <li>• collecting and confirming customer requirements;</li> <li>• presentation of the proposed and final software solution.</li> </ul> <p>Use writing skills to:</p> <ul style="list-style-type: none"> <li>• documenting the software system (for example, drafting technical documents, user manuals);</li> <li>• regularly notifying the client of the progress of work on the system.</li> </ul> <p>Use communication skills when working in a team for:</p> <ul style="list-style-type: none"> <li>• collaborating with other specialists to obtain the desired results;</li> <li>• successful work on group problem solving.</li> </ul> <p>Use project management skills:</p> <ul style="list-style-type: none"> <li>• prioritization and scheduling tasks;</li> <li>• distribution of resources between tasks.</li> </ul>	

3	Application analysis and design	30
	<p>The specialist must know and understand:</p> <ul style="list-style-type: none"> <li>• The importance of taking into account all possible options and making an optimal decision based on sound analytical judgment and taking into account the interests of the client;</li> <li>• The importance of using system analysis and design methodologies;</li> <li>• The need to keep track of new technologies and decide on the appropriateness of their use;</li> <li>• The importance of optimizing a system design with an emphasis on modularity and reusability.</li> </ul>	
	<p>The specialist should be able to:</p> <p>Design an application with:</p> <ul style="list-style-type: none"> <li>• application layout and transitions;</li> <li>• man-machine interface design;</li> <li>• designing security systems and controls;</li> <li>• designing a multi-tier application.</li> </ul>	
4	Application Development	55
	<p>The specialist must know and understand:</p> <ul style="list-style-type: none"> <li>• The importance of taking into account all possible options and developing an optimal solution to meet the requirements of the user and taking into account the interests of the client;</li> <li>• The importance of using system development methodologies;</li> <li>• The importance of taking into account all normal and anomalous scenarios and working with exceptional situations;</li> <li>• The importance of adhering to standards (for example, code of standards, style guides, draft user interfaces);</li> <li>• Use of existing code as a basis for analysis and modifications;</li> <li>• The importance of thorough testing of solutions;</li> <li>• The importance of documenting tests.</li> </ul>	
	<p>The specialist should be able to:</p> <ul style="list-style-type: none"> <li>• Use technology to develop mobile applications;</li> <li>• Use technology to work with databases;</li> <li>• Use technology to work with various data exchange protocols;</li> <li>• Build applications with complex transition logic;</li> <li>• Work with standard platform services (for example: google services);</li> <li>• Work with embedded devices for data acquisition (for example: gyroscope, GPS, accelerometer);</li> <li>• Plan testing (for example, testing of elements, volume testing, comprehensive testing, acceptance testing);</li> <li>• Design test cases with data and validate the results of these examples;</li> <li>• Debug mobile application and fix errors;</li> <li>• Report on the testing process.</li> </ul>	

5	Work with software	5
	<p>The specialist must know and understand:</p> <ul style="list-style-type: none"> <li>• The importance of choosing the most optimal tool for solving professional problems;</li> <li>• Software installation methods;</li> <li>• Software debugging methods;</li> <li>• Methods of setting up individual software components;</li> <li>• Eliminating common software problems.</li> </ul>	
	<p>The specialist should be able to:</p> <ul style="list-style-type: none"> <li>• Install software;</li> <li>• Select and configure software configurations;</li> <li>• Configure individual software components;</li> <li>• Solve software problems;</li> <li>• Analyze the risks when choosing software.</li> </ul>	
	<b>Total</b>	<b>100</b>

## 3 ASSESSMENT STRATEGY AND TECHNICAL FEATURES OF ASSESSMENT

### 3.1 MAIN 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, competition task and Competition Information System (CIS).

Assessment on the WSR competitions falls within one of the two categories: measurements 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 WSK2019SS weightings. The Test Project is the assessment vehicle for the skill competition and should also follow the WSK2019SS. 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 WSK2019SS 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 WSK2019SS.



## 4 MARKING SCHEME

### 4.1 GENERAL GUIDANCE

This section describes the role and place of the Marking Scheme, how the Experts will assess the Competitor's 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 WSK2019SS. It is intended for the allocation of points between each assessed aspect which can be related to only one WSK2019SS module.

Through the reflection of the weightings specified in the WSK2019SS, 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 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 agreed-upon 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 WSK2019SS 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 they match the headings, the Marking Scheme must reflect the weightings specified in the WSK2019SS.

The Assessment Criteria are created by a 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 is calculated by the CIS. This will be the cumulative sum of points awarded to each aspect within that assessment criterion.

## 4.3 SUB CRITERIA

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

Each (sub criteria) marking form is specified with a certain date on which it will be filled.

Each (sub criteria) marking form contains assessable 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 points allocated to each Aspect must fall within the range of points specified for each skill section in the WSK2019SS. It will be displayed in the CIS point allocation spreadsheet in the following format:

Criterion								Total points for the WSK2019SS section	WSK2019SS POINTS FOR EACH SECTION	VARIANCE
WorldSkills Standard Specification (WSK2019SS) Sections		A	B	C	D	E	F			
	1	1	1	1	1	1	1	6	6	0
	2	x	x	x	x	x	5	5	5	0
	3	7	7	5	5	4	2	30	30	0
	4	14	14	9	8	5	x	50	50	0
5	2	2	2	2	x	1	9	9	0	
points for criterio		24	24	17	16	10	9	100	100	0

## 4.5 JUDGEMENT ASSESSMENT

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 that the allotted marks will be compared. In case the Expert marks vary by more than 1 point, the Experts must bring up the assessment of this aspect for discussion and eliminate the variance.

## 4.6 MEASUREMENT 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.

## 4.7 USING MEASUREMENT AND JUDGEMENT ASSESSMENT

Final understanding on measurable and judging scores will be available when the Grade Schedule and the Competition Task are approved. The table below contains approximate information and recommendations for the development of the Evaluation Scheme and the Competition Task.

Criteria	Scores		
	Judgment	Measurement	Total
A Smartphones	1	23	24
B Tablets	1	23	24
C Smart Watches	1	16	17
D Smart-TV	1	15	16
E Testing applications	1	9	10
F Performance	5	4	9
Total	10	90	100

## 4.8 ESTIMATES RULES

The Chief Expert and the Deputy Chief Expert distribute the Experts into groups (a group of at least three people) for grading. Each group must include at least one experienced Expert. The Expert does not evaluate the participant from his organization.

Each Expert serves as a member of the Test Project evaluation team.

The Experts will be divided into assessment teams with the greatest possible equality in the number of assessment criteria.

The composition of assessment teams will be determined by the Chief Expert and the Deputy Chief Expert in order to achieve a balance between the new and experienced Experts in each of the teams.

The Independent Designer of the Test Project should provide Experts with evaluation criteria. Experts will discuss the evaluation criteria upon arrival at the competition.

## 5 TEST PROJECT

### 5.1 MAIN REQUIREMENTS

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

The Test Project duration shall be not less than 14 and not more than 24 hours.

Age qualification of participants to perform the Test Project is from 18 to 27 years.

Regardless of the number of modules, the TP shall include the assessment of each of the WSK2019SS sections.

The Test Project shall not fall outside of the WSK2019SS.

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

Knowledge of the WS 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 be divided into sessions 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);
- The Test Project can be performed using agreed with Experts 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 1 days prior to the competition;
- Each module shall implement functions that can be checked separately or using the rationalized functions from the first module.

### 5.4 TEST PROJECT DEVELOPMENT

The test project is developed based on the samples provided by the Skill Competition Manager on the WS forum. 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 may be involved in the Test Project development:

- Certified WSR Experts;
- Third-party developers;
- Other interested parties.

#### 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 THE TEST PROJECT IS 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 form	The test project of the previous National Competition shall be taken from the Discussion Forum in the unmodified form	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 introduction publication	1 month prior to the competition	1 month prior to the competition	1 month prior to the competition
Introduction to the TP by the Skill Competition Manager	On Day C-2	On Day C-2	On Day C-2
Submission of suggestions on the Discussion Forum on modernization of the TP, IL, TD, LA	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.

A Test project may be approved in any form convenient for the Skill Competition Manager.

## 5.6 MATERIALS PROPERTIES 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 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 are held on a special forum. Solutions for the development of competence should be taken only after a preliminary discussion on the forum. Also the notification on all important events relevant to the skill shall take place on the forum. 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 may include:

- Technical description;
- Test projects;
- Assessment Summary Form;
- Infrastructure List;
- OHSE Instruction;
- Additional information.

### 6.3 ARCHIVE OF TEST PROJECTS

The test projects are available at [www.worldskills.org](http://www.worldskills.org)

### 6.4 SKILL MANAGEMENT

General skill management is carried out by the International Expert and the Chief Expert with a potential involvement of the Expert community.

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



## 7 OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS

### 7.1 OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS AT 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 execution. The Infrastructure List must contain an example of such equipment and its clear and coherent characteristics in case it is possible to obtain this equivalent analogs.

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 to the Competition Organizing Committee and the Skill Competition Manager recommendations on the Infrastructure List changes.

### 8.2 MATERIALS, EQUIPMENT AND TOOLBOX TOOLS

Competitors can bring their own keyboard, mouse and mouse pads. All brought keyboards, mouse and mouse pads must be submitted to a technical Expert for verification. The use of keyboards and mouse with wireless connections is prohibited. Input devices do not need to be programmable and have internal memory.

Competitors can use ear protection. Competitor can bring headphones, but they can be wired only. The organizers will provide access to online music service to every Competitor.

Competitors can prepare list of libraries or plugins for faster and easy project development. This list must be accepted by all Experts of skill competition. Libraries must be open source, free and little bit popular. The Chief Expert may prohibit the use of a particular library.

### 8.3 MATERIALS AND EQUIPMENT PROHIBITED

- A Competitor is not allowed to bring:
  - additional software;
  - any portable communication means, for example, mobile phones or smart watches;
  - portable digital devices (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 15-minutes for one Competitor per session.

## 8.4 PROPOSED COMPETITION WORKSHOP LAYOUT

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 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.

## 9 LIBRARIES AND DOCUMENTATION

### 9.1 LIBRARIES

Competitors can prepare list of libraries or plugins for faster and easy project development. This list must be accepted by all Experts of skill competition. Libraries must be open source, free and little bit popular. The Chief Expert may prohibit the use of a particular library.

### 9.2 DOCUMENTATION

Every Competitor will have access to programming language documentation on official web sites ([developer.apple.com](http://developer.apple.com) and [developers.google.com](http://developers.google.com)) or offline version.

Documentation for external libraries will not be provided.