

# *Standards and Assessment Guide*

## **Software Applications Development**

# Introduction

Welcome to the Standards and Assessment Guide (SAG), a comprehensive resource designed to support excellence in assessment practices for all skills competitions hosted at the WorldSkills Competition. A key component of the SAG is the commitment to continuous improvement through ongoing review, ensuring that these guides consistently reflect the latest industry innovations and high standards of assessment in an open and transparent manner.

## Purpose

The primary purpose of this guide is to provide a structured framework for the consistent and fair assessment of each skill competition. It aims to ensure that all assessments are conducted with a high degree of accuracy, reliability, validity, and reflect global industry standards. By adhering to these guidelines, assessors can maintain the integrity of the competition and uphold the high standards associated with WorldSkills.

**Note:** this guide is not a replacement for the Marking Scheme and should only be used as a reference when required during the assessment process. Competitors are not allowed to have a copy of this SAG in the workshop in either digital or paper form.

## Scope

This document covers general assessment practices applicable to a diverse range of industry sectors including:

- Manufacturing and Engineering Technology
- Information and Communication Technology
- Construction and Building Technology
- Transportation and Logistics
- Social and Personal Services
- Creative Arts and Fashion

Each skill competition has its unique requirements and benchmarks, which are detailed within sections of this guide. The consistency of assessment across each skill is the overarching principle, ensuring a unified approach to evaluating Competitor performance to the highest standards.

# Key Components

The guide is structured into several key components, each addressing critical aspects of the assessment process:

## Assessment Principles and Objectives

- Emphasis on fairness, transparency, and objectivity in assessments.
- Alignment with global industry standards and best practices.

## Assessment Methods and Tools

- Description of various assessment methods in Measurement and Judgement.
- Guidance on the application of appropriate assessment tools and equipment (if applicable).

## Criteria and Benchmarks

- Examples of assessment criteria and aspects for each skill, outlining the expected competencies and performance standards.
- Benchmarks for different levels of proficiency i.e. Judgement award range 0, 1, 2, 3 or Yes/No criteria alongside clear measurable descriptors.

## Expert assessment requirements

- Completion of the Access Programme.
- Approved Curriculum Vitae (CV).
- Reaching **100%** Expert preparedness.
- Full participation of online and in-person Mandatory Assessment Training (MAT).
- Completion of practical assessment testing at the Competition.

## Quality Assurance and Improvement

- Monitoring and evaluation: Ensuring assessments are carried out correctly and produce reliable results.
- Continuous improvement: Using feedback from Experts and Skill Competition Managers to enhance future assessments.
- Periodic review: Regularly updating processes to reflect current industry and WorldSkills standards.

## Implementation

For effective implementation, this guide should be used for guidance purposes only and in parallel with the Technical Description for each skill. Experts are encouraged to familiarize themselves thoroughly with both the general guidelines and the particular requirements of their respective skill areas. Collaborative efforts between the Skill Management Team, Experts, and Competitors are vital for achieving the ultimate goal of global skills development.

## Conclusion

The Standards and Assessment Guide embodies the commitment of the WorldSkills movement to nurturing talent and promoting the highest standards of vocational education and training worldwide. By providing clear and comprehensive guidance, we aim to empower Experts to conduct marking and assessment practices that are not only rigorous and equitable but also inspiring and transformative for all participants.

Thank you for your dedication to upholding these standards and contributing to the success of the WorldSkills Competition. Together, we can continue to champion skills excellence and celebrate the achievements of talented individuals from around the globe.

## Skill 09 – Software Applications Development

### Measurement

Measurement is used to assess accuracy, precision, and other performance that can be measured objectively. It is used where ambiguity must be avoided.

The total marks allocated to measurement marking may vary from competition to competition depending on the Test Project.

|   |                                            |
|---|--------------------------------------------|
| 1 | Work Organization and Management           |
| 2 | Communication and Interpersonal Skills     |
| 3 | Problem Solving, Innovation and Creativity |
| 4 | Analysis, Design and Software Solutions    |
| 5 | Development and Software Solutions         |
| 6 | Testing Software Solutions                 |

## Measurement:

### Criteria A: Work organization and management

| Criteria ID | Sub Criteria                             | Aspect Description                                                                              | Extra Aspect Description                                                                                                                             | Score | Max Marks | Competitor work: (after demonstration)                                                                            |
|-------------|------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|-------------------------------------------------------------------------------------------------------------------|
| A1          | Session 1- Correct delivery of all tasks | Proper time and work management that results in correct delivery of all requested forms or tabs | <ul style="list-style-type: none"> <li>Deduct 0.5 for all the requests are not fulfilled</li> <li>Deduct 0.25 if each missing deliverable</li> </ul> | 0.25  | 1         | 1. 4 out of 5 main tasks UI workflow is correctly.<br>2. 2 out of 5 tasks requirement is not completely fulfilled |
|             |                                          | <b>M</b>                                                                                        |                                                                                                                                                      |       |           |                                                                                                                   |

#### **ANSWER: The Competitor has Scored (0.25)**

The main five tasks of the session 1 including "Login", "Forget Password", "Main Menu", "User Profile update", "Logout"

Demonstration found:

1. the workflow of "Login", "Forget Password", "Main Menu", "Logout" and correctly show the correct workflow and missing "User Profile update" UI. (deduct 0.25)
2. Therefore, not all request fulfilled (deduct 0.5)
3. Functional requirements, such as "the message should be displayed while login failed", should not be marked in this criterion.

## Criteria B: Communication and interpersonal skills

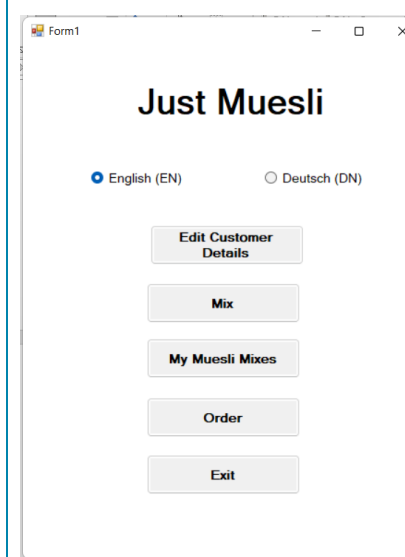
| Criteria ID | Sub Criteria                                  | Aspect Description                                                            | Extra Aspect Description                                                                                                                                                      | Score | Max Marks | Competitor work: (after demonstration)                                                                                                 |
|-------------|-----------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|
| B1          | Session 1- Correct understanding of all tasks | Proper understanding of the technical documentation and application structure | <ul style="list-style-type: none"> <li>Full marks if all sections are understood</li> <li>Deduct 0.2 if less than 50% of sections are not shown to be comprehended</li> </ul> | 1     | 1         | 1. 4 out of 5 main tasks UI workflow is correctly.<br>2. Over 50% of the measurement description in other criteria has been fulfilled. |
|             |                                               | <b>M</b>                                                                      |                                                                                                                                                                               |       |           |                                                                                                                                        |

### **ANSWER: The Competitor has Scored (1)**

The main five tasks of the session 1 including "Login", "Forget Password", "Main Menu", "User Profile update", "Logout"

- the workflow of "Login", "Forget Password", "Main Menu", "Logout" and correctly show the correct workflow and missing "User Profile update" UI.
- Functional requirement "the message should be displayed while login failed" did not work properly. However, this is 1 of the 10 functional requirements of the login screen.

## Criteria C: Problem solving, innovation, and creativity

| Criteria ID | Sub Criteria                                             | Aspect Description                                                                                                                   | Extra Aspect Description                                                                                                                                                                               | Score | Max Marks | Competitor work: (after demonstration)                                               |
|-------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|--------------------------------------------------------------------------------------|
| C1          | Session 5- Problem Solving in Bilingual interface design | The menu is displayed after launching the application, user can switch the languages of the UI by selecting the designated language. | <ul style="list-style-type: none"> <li>Add 0.25 if using a radio button or dropdown menu to select language</li> <li>Add 0.25 if the language can be changed correctly to selected language</li> </ul> | 0.5   | 0.5       |  |
|             |                                                          | M                                                                                                                                    |                                                                                                                                                                                                        |       |           |                                                                                      |

### ANSWER: The Competitor has Scored (0.5)

1. Competitor implemented the language selection feature with a radio button
2. The interface can change to Deutsch once selected "Deutsch (DN)" and it can change to English once selected "English (EN)"

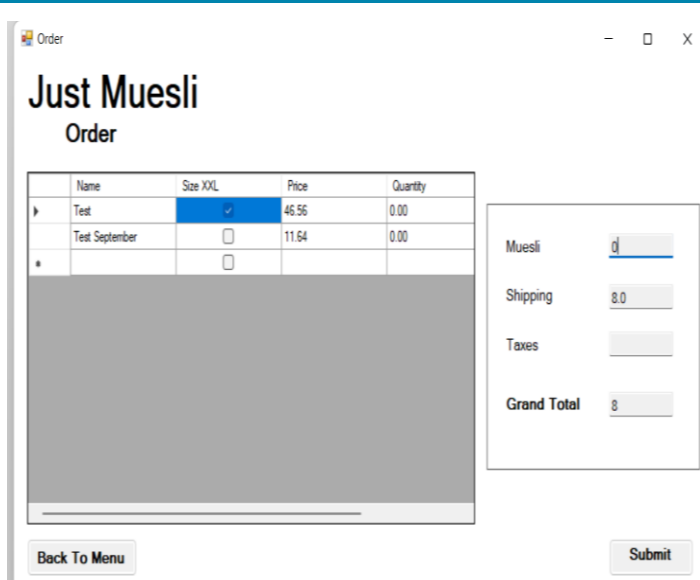
## Criteria D: Analysing and designing software solutions

| Criteria ID | Sub Criteria                                                    | Aspect Description                                                         | Extra Aspect Description                                                                                                                                                                                                                                                                       | Score | Max Marks | Competitor work: (after demonstration)                                                                                                 |
|-------------|-----------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|
| D1          | Session 1- Acceptable analysis and perception of the directives | There are clear signs that the solution confirms to what has been intended | <ul style="list-style-type: none"> <li>• Deduct 0.5 for lack of understanding of the database</li> <li>• Deduct 0.5 for lack of understanding of app structure</li> <li>• Deduct 0.1 for each missing form or page</li> <li>• Add 0.5 if less than 50% variance to the instructions</li> </ul> | 1.9   | 2.5       | 1. 4 out of 5 main tasks UI workflow is correctly.<br>2. Over 50% of the measurement description in other criteria has been fulfilled. |
|             |                                                                 | <b>M</b>                                                                   |                                                                                                                                                                                                                                                                                                |       |           |                                                                                                                                        |

### **ANSWER: The Competitor has Scored (1.9)**

1. The main five tasks of the session 1 including "Login", "Forget Password", "Main Menu", "User Profile update", "Logout"
2. the workflow of "Login", "Forget Password", "Main Menu", "Logout" and correctly show the correct workflow and missing "User Profile update" UI. (Deduct 0.1) the login feature did not connect to the database. It only login based on a user not existed in the database. (Deduct 0.5)

## Criteria E Development of Software Solutions

| Criteria ID | Sub Criteria             | Aspect Description                                                                                                                                                         | Extra Aspect Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Score | Max Marks | Competitor work: (after demonstration)                                              |
|-------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|-------------------------------------------------------------------------------------|
| E4          | Ordering summary preview | The Order should show quantity, Shipping Cost, Taxes and the Grand Total. Selected items and quantity entered displayed correctly and grand total is calculated correctly. | <ul style="list-style-type: none"> <li>• Add 0.2 if quantity is displayed</li> <li>• Add 0.2 if shipping cost is displayed</li> <li>• Add 0.2 if corresponding tax is displayed correctly</li> <li>• Add 0.2 if grand total is displayed</li> <li>• Add 0.5 if selected items with corresponding unit price and quantity are displayed correctly</li> <li>• Add 0.2 if Back to Menu and Submit buttons are displayed</li> <li>• Add 0.5 if Grand total calculated correctly</li> <li>• Deduct 0.1 for each item not related displayed</li> </ul> | 1.7   | 2         |  |

### ANSWER: The Competitor has Scored Partial Marks (1.7) as:

1. Missing corresponding tax value (no mark gain), all the other components and data are displayed correctly (Add 1.8) (Coloured in red did not add)
2. An item (Muesli) is shown in the screen which is not requested by the requirement (deduct 0.1 marks)

## Criteria F Testing

| Criteria ID | Sub Criteria | Aspect Description       | Extra Aspect Description                                                                                                                          | Score | Max Marks | Competitor work: (after demonstration)                                                                                 |
|-------------|--------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------------------------------------------------------------------------------------------------------------------|
| F1          | Unit test    | Implementation Unit Test | <ul style="list-style-type: none"> <li>Add 1.0 if login user tested</li> <li>Add 1.0 if retrieve user profile from the database tested</li> </ul> | 1     | 2         | 1. A unit testing project is included in the Visual Studio Solution.<br>2. Only login user tested with successful case |

**ANSWER: The Competitor has Scored Partial Marks (1)**

## Judgement

Judgement is used to assess the quality of performance about which there may be small differences of view when applying the external benchmarks /standards.

The Resources column in the table below may include all kinds/formats of resources such as a link to a YouTube video, a website link, an illustration, a photo, a reference to a book, and so on. It needs to be as detailed as possible to show the differentiation between 0, 1, 2, 3.

### Generic rules:

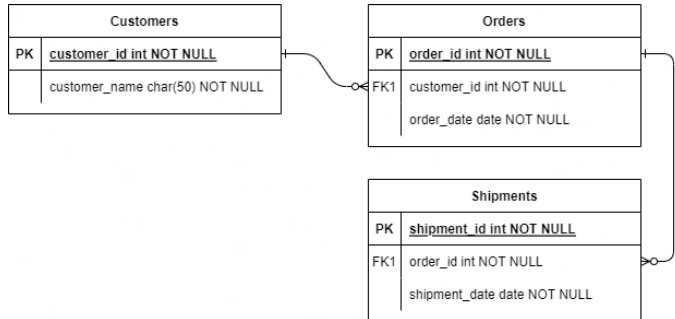
The assessment group comprises three Experts plus one Expert who acts as the supervisor. The supervising Expert will replace an Expert in the marking group to prevent compatriot marking.

The difference of the three Experts' scores may not exceed 1. If this is the situation the Experts must re-score until there is a maximum difference of 1. As long as the three Experts judge within 1, the result can be entered into the CIS.

The total marks allocated to judgement marking may vary from competition to competition depending on the Test Project.

Examples for Judgement:

## Criteria B: Communication and interpersonal skills

| Criteria ID | Sub Criteria         | Aspect Description                                         | Extra Aspect Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Score | Max Marks | Competitor work: (after demonstration)                                              |
|-------------|----------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|-------------------------------------------------------------------------------------|
| B5          | Session 7 – Surprise | The layout of the diagram is up to industry standard (ERD) | <p>0. The proper shapes are not used, relations and associations are missing, functionalities and requirements are not met</p> <p>1. Functionalities and requirements are represented; relations and associations are not correct and proper shapes are not used</p> <p>2. Functionalities and requirements are represented; relations and associations are correct but proper shapes are not used</p> <p>3. Everything is up to the industry standard with all functionalities, requirements, relations and association drawn with correct shapes</p> | 2     | 1         |  |

**ANSWER: The Competitor has Scored Marks (2) as:**

1. Everything is up to the industry standard, relations and association drawn with correct shapes; BUT
2. Not all functionalities and attributes shown in the diagram

## Criteria D: Analysing and designing software solutions

| Criteria ID | Sub Criteria                                         | Aspect Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Extra Aspect Description                                                                                                                                                                                                                                                                                                        | Score | Max Marks | Comment by expert                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D1          | Acceptable analysis and perception of the directives | <p>The user experience (UX) design of the interface is optimal.</p> <p>Link to industry standard:</p> <p>1) <a href="https://learn.microsoft.com/en-us/windows/win32/appuistart/-user-interface-principles">https://learn.microsoft.com/en-us/windows/win32/appuistart/-user-interface-principles</a></p> <p>2) <a href="https://learn.microsoft.com/en-us/windows/win32/appuistart/designing-a-user-interface?source=recommendations">https://learn.microsoft.com/en-us/windows/win32/appuistart/designing-a-user-interface?source=recommendations</a></p> <p>3) <a href="https://learn.microsoft.com/en-us/windows/win32/appuistart/following-guidelines?source=recommendations">https://learn.microsoft.com/en-us/windows/win32/appuistart/following-guidelines?source=recommendations</a></p> <p>4) <a href="https://learn.microsoft.com/en-us/windows/apps/develop/user-interface?source=recommendations">https://learn.microsoft.com/en-us/windows/apps/develop/user-interface?source=recommendations</a></p> | <p>0. The solution provided is not acceptable</p> <p>1. The solution provided is suboptimal (Usability)</p> <p>2. The solution provided is acceptable (Accessibility, Usability)</p> <p>3. Everything is up to the industry standard the solution provided is optimal (Accessibility, Desirability, Credibility, Usability)</p> | 2     | 1         | <ol style="list-style-type: none"> <li>The work flow is clear in the overall prototype developed by the competitor.</li> <li>The font size and colour contrast are proper in the design.</li> <li>The overall UI design is not as expected. Not every design following the style guide.</li> <li>For example, there is a button "Item Detail" but there is no response once click on the button. It should be expected there is a response message if the function did not implement.</li> </ol> |

**ANSWER:** *The Competitor has Scored Marks (2) as the comments from the marking expert.*