WorldSkills UK

Website Development
2023 Technical Handbook

Contact Information

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Introduction

Web Developers use coding and software applications to design, construct and implement websites, using both creative and technical skills in a rapidly evolving industry.

Web development languages are amongst the most sought-after programming skillsets, with JavaScript currently in the lead as a growing number of traditional applications move to web platforms. Web development encompasses many different skills and disciplines in the production and maintenance of websites, from creative design, scripting and database management. Accessibility remains a fundamental of any website development project, ensuing that websites are accessible by anyone, on any device, anywhere in the world.

Competition Overview

During the WorldSkills UK Website Development competition, participants will receive a brief to work to throughout the three competition stages. The competition includes a range of competencies for web designers and developers.

The competition journey will take you through the following steps outlined below:

Stage 1: Registration

Once you have completed your registration (and accepted all terms and conditions) you will be emailed a link for the entry stage

Stage 2: Entry Stage

When the entry stage has been completed you will be notified to let you know if you have scored high enough to go through to the national qualifiers (the semi-final round). You will then be informed when the National Qualifiers will take place.

Stage 3: National Qualifiers

The 2022 National Qualifiers will be taking place remotely in two stages:

Stage 1: Website Design (Graphics)
Stage 2: Website Development (Coding – HTML & CSS)

Ensure you're ready to compete in your national qualifiers by looking at the **online training resources, core competencies and marking guidelines** below.

This handbook outlines the type of tasks you will be expected to carry out. Ask your lecturer/employer for help in any areas where you feel you could improve and try to gain practical experience in all the task areas of the competition.

Stage 4: WorldSkills UK National Finals

The 8 highest scoring competitors across all the National Qualifiers will be invited to compete at the finals in a venue, details of which will be confirmed at a later time.

Ensure you're ready to compete in the national finals by looking at the **core competencies** and **marking guidelines** below. This outlines the type of competencies you will be expected to carry out. Ask your lecturer/employer for help in any areas where you feel you could improve and try to gain practical experience in all the task areas of the competition.

Stage 5: WorldSkills UK International Competitions

Beyond the national finals, there are a host of opportunities for competitors. Age-eligible competitors who show the highest skills, passion, and drive from the national finals will be given the opportunity to compete to train for the EuroSkills and WorldSkills international competitions.

Those who are not eligible for international competitions may join the Skills Champions programme, which allows continued involvement, including the opportunity to work with WorldSkills UK and visit schools, colleges, and events to inspire the next generations.

Alternatively, if training is of interest to you, you could consider supporting WorldSkills UK with organising and training, and even helping to run the National Finals.
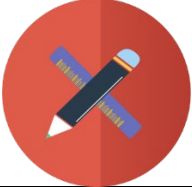
2021 Website Design National Finals

Careers, Jobs and Roles

For information on how to become a web designer, visit WorldSkills UK's designated webpage.

The sample roles below are full time positions found on LinkedIn jobs, suitable for candidates leaving College or University with little prior experience.

Website Design

Key Skills

Skill	Rating
Creativity	★★★★★
Graphic Design	★★★★★
UI/UX	★★★★★
Content Management	★★
Code/Development	★★

Key Technologies
- Adobe Creative Suite
- Image/Media Management
- Vector Graphics (SVG)

A strong portfolio of your design work is essential- this could include work you have completed during your education.

Salary/Job Info:
Junior Web Design (Graphics) – £20-25k
January 2021, Bristol, UK
Availability: Limited (Crossover with Graphics Design Jobs)

Website Development

Key Skills

Skill	Rating
HTML5	★★★★★
CSS	★★★★★
Accessibility	★★★★★
CMS	★★★★★
SEO	★★★★
Design	★★★

Key Technologies
- HTML, CSS JS
- Content Management Systems
- Accessibility, SEO
- Content Presentation

A website development portfolio would be very beneficial. Coursework examples, work experience projects or a personal portfolio site would be highly advantageous.

Salary/Job Info:
Junior Web Developer £20-25k
January 2021, Bristol, UK
Availability: Wide availability, including grad positions and some apprenticeships.

Front-End Website Developer

Front-end development positions are typically very JavaScript heavy, with a focus on frameworks like React, Angular and Vue. Front-end development can also be very creative and require experience of UI/UX frameworks.

Key Skills

Skill	Rating
HTML5/CSS3	★★★★★
JavaScript	★★★★★
Frameworks	★★★★★
UI/UX	★★★
Testing	★★★

Key Technologies
- HTML5, CSS
- JavaScript (& jQuery)
- Libraries, eg Angular, React, Vue
- Able to work with APIs

Salary/Job Info:
Graduate Front-End Developer £25-30k
January 2021, Bristol, UK
Availability: In demand (Particularly those with React experience!)

Back-end Developer

Back-end development is typically a lot more code (and database) orientated. Problem solving, attention to detail and familiarity with databases is essential.

Key Skills

Skill	Rating
Coding	★★★★★
Database Development	★★★★★
Knowledge of Frameworks	★★★★★
Knowledge of MVCs	★★★
Codebase Management	★★★
Teamwork	★★★★★

Key Technologies
- PHP/Node.js/.net
- Databases (SQL)
- Knowledge or experience using an MVC
- WebApp Development

Salary/Job Info:
Graduate Developer (Back-end WebApps) £25-34k
January 2021, Bristol, UK
Availability: In demand (Language and salaries vary)

Core Competencies

Core competencies are the key set of skills and knowledge that are tested throughout the competition. Below will outline all the core competencies assessed and at which stage of the competition.

Website Development Core Skills	Passive Stage	Regional Qualifiers	UK Finals	International
Work organisation and management (General)				
Code documenting and commenting		✅	✅	✅
File Management best practice	✅	✅	✅	✅
Problem solving	✅	✅	✅	✅
Troubleshooting			✅	✅
Error debugging and handling				✅
Use of Version control systems (eg Git)			❗	✅
Website Deployment			✅	✅
Performance optimisation			✅	✅
Module A: Design				
Create, manipulate, and optimize images	✅	✅	✅	✅
Identify target markets and create concept for designs	✅	✅	✅	✅
Create responsive designs that function correctly on multiple screen resolutions and/or devices			✅	✅
Transform ideas into aesthetically pleasing and creative designs	✅	✅	✅	✅
Critique draft concepts, colour, and typography choices				✅
Create wireframes, interactive prototypes, and design of full user interfaces				✅
Module B: Layout				
Standards compliant HTML5 & CSS (W3C)	✅	✅	✅	✅
Effective use of HTML5 semantics, ID's & Classes		✅	✅	✅
CSS pseudo classes		✅	✅	✅
Basic CSS Animation			✅	✅
3D animation				✅
Use of CSS pre/post processors				✅
CSS positioning & layout		✅	✅	✅
Responsive Grid Systems (Responsive/Adaptive web design)			✅	✅
Website Accessibility			❗	✅
SEO			❗	✅

Module C: Front-End Development				
JavaScript			🔵!	✅
jQuery (eg Show/hide elements, manipulate DOM, Form Validation, interaction)		🔵!	✅	✅
JavaScript Animation				✅
JavaScript frameworks (eg React, Angular Typescript)				✅
API interaction				✅
JavaScript Data Manipulation				✅
JavaScript Unit Testing				✅
Module D: Back-End Development				
Procedural PHP			✅	
Protect against security exploits			✅	✅
Object Orientated PHP				✅
Open Source server-side Libraries and Frameworks (Laravel)				✅
Use of SSH (NPM, file permissions and ownership)				✅
Design and create SQL databases			✅	✅
Basic procedural SQL (SELECT, INSERT, UPDATE, DELETE)			✅	✅
PDOs & relational databases				✅
MVCs				✅
Unit testing/automated testing				✅
Content Management Systems				
Install, configure, and update Content Management Systems			🔵!	✅
Install, configure, and update CMS plugins/modules			🔵!	✅
Configure, implement security and protection on the CMS				✅
Use and modify open source theme starters to create themes for CMS				✅
Create custom themes/templates for Content Management Systems				✅
Create custom plugins/modules/ widgets				✅

Key	
✅	Current Expectations
🔵!	Future planed competitions

What language(s) should I learn?

The good news is there are loads of resources online to help you learn and develop- as well as some very supportive communities!

Client-Side Scripting

Client-Side Scripting languages are typically used in "Front End" development and are usually more creative and interactive. Start with the basics of HTML and CSS.

- Code Quality: Keeping your code neat, understandable, and well documented (code comments) is very important, particularly in industry. This is also assessed in competition too!
- Accessibility: Websites should be accessible to Anyone, Anywhere, on Anything. From responsive and reactive website design, screen-reader compatibility, standards compliancy, and website performance all sites should developed to be universally accessible regardless of user impairments, location, or digital technology.
- Search Engine Optimization: Companies will often rely heavily on search engines to channel traffic to their sites. There are no shortcuts to successful SEO, however there are many things we can do as developers and it is important to plan your SEO from the beginning.

The only JavaScript library used at WorldSkills UK is **jQuery**, however as you get more competent, JavaScript libraries such as React, Angular and Vue will allow you to build more powerful asynchronous web applications and are highly sought-after (and very employable) skillsets: A competent React developer with 3-4 years' experience can expect salary of £40,000-£50,00, or £300-£400 per day as a contractor!

Server-Side Scripting

Server-Side Scripting Languages are a little trickier: there are a lot more choices, including PHP, .net, Node.js... or even Ruby/Rails for the brave! Although we have found many UK companies appear to be using Microsoft .net (ASP, C#, core etc) and Node.js, WorldSkills International use PHP and MySQL exclusively.

PHP

PHP is a mature, and very accessible server-side scripting language. Although PHP is sometimes seen as a dated language, its maturity and extensive online resources and training make it a very accessible. As of 2021, 80% of websites are scripted in PHP- significantly more than any other competitor.

 At the UK Finals you will be required to use procedural, vanilla PHP. At WorldSkills International competitions, Object Orientation is essential, and PHP frameworks (currently Laravel or PHPStorm) are used, but don't worry: An extensive training programme delivered by industry experts is provided for those competing at International level!

Typical tasks required at World Skills (National Final) include:

- Form design/management (Contact forms, login, data input etc)
- Database interaction (see below)
- Data management and formatting
- Login/Authentication (SESSIONS)
- Security (eg SQL Injection protection, XSS, password hashing)

MySQL

MySQL (or MariaDB!) is a very popular relational database engine used to power a significant proportion of the web: If you have prior experience using Microsoft SQL Server or Microsoft Access (*shudders*) you will find these are very transferable.

Typical tasks required at World Skills (National Final) include:

- Design, create and manage a small relational database
- Perform basic SQL operations (eg SELECT,INSERT,UPDATE,DELETE,JOIN)
- SQL security considerations

The Rise of the WebApp

Advancements in web platforms, portability, scalability and desire for highly interactive online experiences have resulted in Web Applications replacing many traditionally 'installed applications. Much of the software that may have traditionally been downloaded, installed/deployed and run is now web based: the chances are your college/university registers, timetabling, HR, banking, training and financial platforms are now more likely to be web-based!   Web development is increasingly less restricted to consumer-facing websites and e-commerce solutions: The greatest industry growth/demand is in Web applications.

The below outlines the core competencies expected of competitors, measured against qualifications related to web design.

Website Design Standards Mapping	Level 2 BTEC	Level 3 BTEC	Level 4*	T-Level	BSc DaTS	HE
Work organization and management (General)						
Code documenting and commenting	B	P		T	A	HE
File Management best practice	B	P		T	A	HE
Problem solving		P		T	A	HE
Troubleshooting		P		T	A	HE
Error debugging and handling					A	HE
Use of Version control systems (eg Git)					A	HE
Website Deployment				T	A	HE
Performance optimisation		P		T	A	HE
Module A: Design						
Create, manipulate, and optimize images	B	P		T	A	HE
Identify target markets and create concept for designs	B	P		T	A	HE
Create responsive designs that function correctly on multiple screen resolutions and/or devices				T	A	HE
Transform ideas into aesthetically pleasing and creative designs		P				HE
Critique draft concepts, colour, and typography choices	B	P				HE
Create wireframes, interactive prototypes, and design of full user interfaces		P		T		HE
Module B: Layout						
Standards compliant HTML5 & CSS (W3C)	B	P		T	A	HE
Effective use of HTML5 semantics, ID's & Classes		P		T	A	HE
CSS pseudo classes		P		T	A	HE
Basic CSS Animation					A	HE
3D animation						
Use of CSS pre/post processors					A	
CSS positioning & layout		P		T	A	HE
Responsive Grid Systems (Responsive/Adaptive web design)		P		T	A	HE
Website Accessibility	B	P		T	A	HE
SEO		P		T	A	HE
Module C: Front-End Development						
JavaScript		P		T	A	HE

jQuery (eg Show/hide elements, manipulate DOM, Form Validation, interaction)		P		T	A	🎓
JavaScript Animation						🎓
JavaScript frameworks (eg React, Angular Typescript)					A	
API interaction				T	A	🎓
MVCs					A	🎓
JavaScript Data Manipulation					A	🎓
JavaScript Unit Testing						
Module D: Back-End Development						
Procedural PHP		P		T	A	🎓
Protect against security exploits				T	A	🎓
Object Orientated PHP					A	🎓
Open-Source server-side Libraries and Frameworks (eg Laravel)					A	🎓
Use of SSH (NPM, file permissions and ownership)					A	
Design and create relational databases				T	A	🎓
Basic procedural SQL (SELECT, INSERT, UPDATE, DELETE)				T	A	🎓
PDOs & relational databases					A	🎓
MVCs				T	A	🎓
Unit testing/automated testing				T		
Content Management Systems						
Install, configure, and update Content Management Systems		B				🎓
Install, configure, and update CMS plugins/modules		B				🎓
Configure, implement security and protection on the CMS						🎓
Use and modify open source theme starters to create themes for CMS						🎓
Create custom themes/templates for Content Management Systems						
Create custom plugins/modules/ widgets						

Example relevant courses and modules:

Level 2
 BTEC, Cambridge Tec, T-Level transitional programmes
Level 3 BTEC Nationals (QCF) 2010
 Unit 20: Client Side Customisation of Web Pages
 Unit 27: Web Server Scripting
 Unit 28: Website Production
Level 3 BTEC IT (RQF) 2016
 Unit 6: Website Development
Level 3 BTEC Foundation Diploma in Computing (2020)
 Unit 15: Website Development

Level 4
New programmes announced- awaiting draft specs.

BSc Digital and Technology Solutions (L4-L6)
 BCS standards specification- although modules and content will vary across institutions and your pathway.

Digital T-Levels

The new Digital T-Levels currently being rolled out are very well aligned with World Skills Web design, up to a National competition level, and close to International standards: At Weston College we began

delivering T-Levels from September 2020 and hope many of the resources developed to support competitors may be of benefit across these programmes.

6 Implement a solution using at least two appropriate languages	
What students need to learn	
6.1 Select and use languages to create a software solution for a software project appropriate to the context and market environment in which they are developing software	

• Select and use at least two appropriate languages to implement front-end and back-end solutions:
  ○ Python
  ○ C, C# and C++
  ○ Javascript frameworks (Angular, React)
  ○ Java
  ○ Go
  ○ Ruby
  ○ PHP
  ○ SQL
• Node.Js.
• Be able to embed programming languages within HTML5 and CSS as required.
• Be able to select and use appropriate application programming interfaces (APIs), packages, modules and libraries to add functionality and compatibility:
  ○ generating dynamic page content
  ○ containerisation
  ○ stateful vs stateless components
  ○ form handling
  ○ file and data handling:
    – handle local files
    – create, open, read, write, delete and close files on a server
    – send and receive cookies
    – add, delete and modify data in a database
  ○ interface components
  ○ media content
  ○ adaptive/responsive layout
	E5
	M1 M2
	M3 M4
	M5 M6
	M7 M8
	M10
	D1 D2
	D3 D4
	D6

Digital T-Level Spec v1.0

Software & Tools

Please find a list of the current software available to use in the WorldSkills competitions below. You do not need ALL the software and are free to choose your preferred applications!

Website Design		
Adobe CC: Photoshop & Illustrator*	Win/MacOS	Commercial
Adobe XD	Win/MacOS	Commercial
Paint.net	Win/MacOS/Linux	Free (Open Source)
GIMP	Win/MacOS/Linux	Free (Open Source)
Client-Side Scripting		
Visual Studio Code*	Win/MacOS/Linux	Free (Open Source)
~~Brackets (discontinued 🙁)~~	~~Win/MacOS/Linux~~	~~Free (Open Source)~~
Notepad++	Win/MacOS/Linux	Free (Open Source)
Atom	Win/MacOS/Linux	Free (Open Source)
Google Chrome	Win/MacOS/Linux	Free
Edge Chromium	Win/MacOS/Linux	Free
Firefox Web Developer Edition	Win/MacOS/Linux	Free (Open Source)
FileZilla FTP Client	Win/MacOS/Linux	Free (Open Source)
Server-side Scripting		
XAMPP	Win/MacOS/Linux	Free (Open Source)
PHP 7.4+ (8.1 in testing)	Win/MacOS/Linux	Free (Open Source)
MySQL or MariaDB (Latest)	Win/MacOS/Linux	Free (Open Source)
PhpMyAdmin (Latest)	Win/MacOS/Linux	Free (Open Source)
Apache 2.4	Win/MacOS/Linux	Free (Open Source)
PHPStorm		Free for students/educators.

*Where possible we use Open Source/freely available, cross-platform software: The only exception to this is the Adobe Creative Cloud (Illustrator/Photoshop/XD)

The entry competitions have been designed to work with any graphics application, however we would highly recommend using Adobe at National and International levels.

Competition Environment

Although most applications are cross-platform, in all WorldSkills competitions only Microsoft Windows (10) is used. You will also have access to dual monitors (1920*1080). All assessment work is completed without internet access.

Educators: All the software listed above is easily deployable and widely used in Schools, Colleges and Universities in the UK and internationally. Most applications also provide user level installers, or standalone/portable editions if deployment is 'challenging'- don't forget you can use https://vscode.dev/ without any installation 😊

Pre-competition Activity

In addition to the marking guidelines and other resources outlined further below this document, competitors are encouraged to prepare for the competitions by making use of the sample assessments provided below. The tasks outlined within the pre-competition activity are sampled from previous competitions and designed to outline the type of tasks and skill that will be expected of you.

Sample Assessments and Training Resources

Sample assessments for all modules may be downloaded from the resource repository below. We are also adding a range of training resources, expert advice, and sample student work to help competitors prepare for this years competitions:

WorldSkills UK Website Design Competitions (remote.ac) https://worldskills.remote.ac

Entry Stage: what to expect

Shortly after registration closes you will be sent details of this years online entry assessment. This stage of the competition will be online and will be testing your knowledge of:

- Web technologies and browsers
- File types
- Core HTML & CSS knowledge
- Accessibility

National Qualifier: what to expect

For the national qualifier you will be required to put your design and coding to the test in two stages:

Stage 1: Graphics Design

You will be provided with a brief/specification, assets (images, logos etc) and text for a sample site, which can be created in any widely used graphics design application of your choice (We recommend, Adobe XD, Photoshop, Illustrator Paint.net, GIMP etc).

This task should take around 3 hours, however you will have ~10 days to complete this stage either in your own time at home or at your place of study if you prefer.
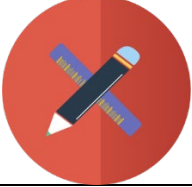
Stage 2: Website Development

At this stage you will be required to apply your practical skills using HTML and CSS.   Please see the software listing above for recommended IDEs. Typically you will be required to build a working webpage to match a provided design spec - see "Core Competences" section for further details of assessed skills.

Unlike Stage 1, this Stage 2 is completed in 3 hours, under controlled conditions using our online remote assessment platform (full instructions and training will be provided when you reach this stage).

National Finals: what to expect

During the national finals there will be four modules that competitors will be assessed:

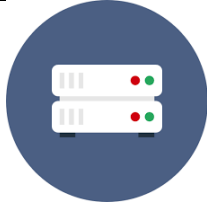| Module A: Website Design |
| --- |
| |
| You will be required to design a professional, modern website to a company brief using the branding guidelines and assets provided. This module will take the skills developed for the Passive stage, focusing on attention to detail and professional design. |
| Assessment Duration: Typically, 2.5 or 3 hours
Internet Access: None
Core Competences: "Work organization and management" AND Module A competences (Referenced above) |

Module B: Website Layout
You will be required to code a working website to a provided brief using advanced HTML and CSS techniques. Best practice, accessibility (including reactive/adaptive website design techniques) and advanced use of CSS will be assessed as well as your completed tasks.
Assessment Duration: Typically, 2.5 or 3 hours Internet Access: None Core Competences: "Work organization and management" AND Module B competences (Referenced above)

Module C: Front End Development
This site will require you to complete a series of tasks using JavaScript/jQuery. Typical tasks include creating interactive website elements, manipulating objects on a webpage, debugging/fixing broken code snippets. Code layout and documentation (code commenting etc) is also very important in this module.
Assessment Duration: Typically, 2.5 or 3 hours Internet Access: None Core Competences: "Work organization and management" AND Module C competences (Referenced above)

Module D: Back-End Development
This task will require you to develop a server-side scripted site using PHP and MySQL. Typical tasks may include authentication systems, booking/registration, forms and managing database information. Testing and securing your code is also very important in this task.
Assessment Duration: Typically, 2.5 or 3 hours Internet Access: None Core Competences: "Work organization and management" AND Module D competences (Referenced above)

Speed Challenge (New!)

The speed challenge will consist of a selection of much smaller tasks using both Client Side and Server-Side Scripting. Competitors must complete as many tasks as possible in each timeframe. As well as working on time management, working under pressure and tactical selection of the tasks undertaken will be critical in this module!

Resources and further information

If you have any questions regarding the competition, please do not hesitate to get in touch.

The competition is grateful to be supported by a network of sponsors and industry experts from University Centre Weston, Airbus, JISC, NBDA and the UK Hydrographic Office.

Throughout the competition and qualifiers we will be hosting a wide range of training and preparation sessions, lead by industry experts, past competition winners and the national judging team and would highly encourage competitors (and educators) to make the most of the opportunities available.