

## Form B

### Competition Brief

#### Competition title and level

Coding – Advanced

#### Entry requirements

This competition is intended for those competitors who have studied or are studying Level 3 BTEC Diploma or equivalent.

#### Competition outline

This competition focuses on all the essential requirements for a successful career as a computer programmer within any industry.

This competition encourages practical programming to solve problems, and will test your ability to develop software to meet customer requirements. A series of on-screen tests will see you try out your debugging skills, test code and create new applications. The competition will also require you to program a Lego Mindstorms robot.

Competitors should be familiar with either:

- Visual Basic.NET
- Python
- C#
- Java

Competitors should be able to:

- Understand and use their chosen GUI & IDE
- Understand Event Driven Programming concepts

The tasks will require work to be completed using either Visual Basic.NET, C#, Python **or** Java which have integrated development environments (IDE) freely available for legal download.



## The detail

Competitors will undertake a series of practical tasks which will demonstrate their abilities and skills in software development and coding.

The full competition brief will be provided to each competitor on the morning of the competition heat.

The scope of the competition covers the main features of the job role of a computer programmer. These are:

### Data representation and data types

Identify and explain the use of constants and variables in algorithms and programs  
Use self-documenting identifiers, annotation and identify appropriate program layout

### Data structures

Create code to save data from an array to a file  
Create code to open a file and read the data into an array  
Create code to append data from an array to a file  
Create code to save data

### Data validation and verification

Design algorithms and programming routines that validate and verify data

### Troubleshooting / Debugging / Testing

Dry-run a program or algorithm in order to identify possible errors

### Program Development

Use a documented design to produce a functional prototype to a given problem:  
Produce a range of screens and outputs for the prototype solution  
Create a functioning system that carries out all chosen processes  
Use realistic data for output, storage and testing

## Marking and assessment

All marks are objective and will be awarded by the judges as follows

<b>A</b>	Variables/Naming Conventions	<b>5%</b>
<b>B</b>	Modules, subroutines and functions	<b>10%</b>



<b>C</b>	Data processing –saving, opening, appending to a file, searching	<b>15%</b>
<b>D</b>	Data validation/verification	<b>15%</b>
<b>E</b>	Program construction	<b>30%</b>
<b>F</b>	Fault Finding/troubleshooting/debugging/testing	<b>25%</b>
<b>Total</b>		<b>100%</b>

Each competition test will be assessed and marked independently of the other test. The tests will be assessed and marked in accordance with the general and specific competition rules.

A panel of judges have been drawn from industry, colleges and training providers. The judges' decisions will be independently moderated and quality assured before being confirmed.

Up to 3 competitors per college/organisation may enter this competition.

### Competition rules

- Mobile phones to be switched off during competition activity.
- Listening to music via headphones is not permitted during competition activity.
- Any questions during competition activity should be addressed to the competition judging panel.
- Competitors should not communicate with other competitors during competition activity.
- It is the responsibility of each competitor to arrive on time for each competition session. No additional time will be allowed if you arrive late.
- Technical failure of your equipment should be reported immediately to the judging panel. Additional time will be allocated if the fault is beyond the control of the competitor.

### Contact details

#### Lead Contact

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#### Expert Contacts

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## Ffurflen B

### Briff y Gystadleuaeth

#### Teitl a lefel y gystadleuaeth

Codio – Uwch

#### Gofynion mynediad

Bwriadir y gystadleuaeth hon ar gyfer cystadleuwyr sydd wedi astudio neu sydd yn astudio ar gyfer Diploma Lefel 3 BTEC neu gyfatebol.

#### Amlinelliad o'r gystadleuaeth

Mae'r gystadleuaeth hon yn canolbwyntio ar y gofynion angenrheidiol sydd eu hangen am yrfa lwyddiannus fel rhaglennydd cyfrifiadurol o fewn unrhyw ddiwydiant.

Mae'r gystadleuaeth hon yn annog rhaglennu ymarferol er mwyn datrys problemau a bydd yn profi'ch gallu i ddatblygu meddalwedd a fydd yn cwrdd ag anghenion y cwsmer. Bydd nifer o brofion ar y sgrin yn gyfle i chi arddangos eich sgiliau difa bygiau, profi cod a chreu cymwysiadau newydd. Bydd hefyd rhaid i chi raglennu robot Lego Mindstorm fel rhan o'r gystadleuaeth.

Dylai cystadleuwyr fod yn gyfarwydd â naill ai:

- Visual Basic.NET
- Python
- C#
- Java

Dylai cystadleuwyr hefyd:

- Ddeall a defnyddio eu GUI a'u IDE dewisedig
- Ddeall cysyniadau Rhaglennu Digwyddiadau

Bydd gofyn i'r dasg gael ei chwblhau drwy ddefnyddio naill ai Visual Basic.NET, C#, Python **neu** Java sydd ag amgylcheddau datblygu integredig (IDE) ac sydd ar gael i'w lawr lwytho am ddim.



## Y manylyn

Bydd cystadleuwyr yn cwblhau cyfres o dasgau ymarferol a fydd yn arddangos eu galluedd a'u sgiliau wrth ddatblygu meddalwedd a chodio.

Bydd y briff llawn yn cael ei ddarparu ar gyfer pob cystadleuydd ar fore'r gystadleuaeth.

Mae cwmpas y gystadleuaeth yn cynnwys prif nodweddion swydd rhaglennydd cyfrifiadurol, sef:

### Cynrychiolaeth data a mathau o ddata

Dynodi ac esbonio defnydd cyfyngiadau ac amrywiadau mewn algorithms a rhaglenni  
Defnyddio dynodiadau dogfennu personol, anodiad a dynodi cynllun rhaglennu addas

#### Strwythurau data

Creu cod i gadw data o arae i ffeil

Creu cod i agor ffeil a darllen y data ar arae

Creu cod i atodi data o arae i ffeil

Creu cod i gadw data

#### Dilysu a gwirio data

Cynllunio algorithmau ac arferion rhaglennu sy'n dilysu a gwirio data

#### Canfod problemau / Difa Bygiau / Profi

Profi rhaglen neu algorithm er mwyn dynodi problemau posib

#### Datblygu Rhaglen

Defnyddio cynllun sydd wedi ei ddogfennu er mwyn cynhyrchu prototeip gweithiol ar gyfer problem

Cynhyrchu amrywiaeth o sgriniau ac allbynnau ar gyfer datrysiaid y prototeip

Creu system weithredol sy'n cwblhau'r prosesau dewisedig

Defnyddio data realistig ar gyfer allbwn, storio a phrofi

## Marcio ac asesu

Amcanion yn unig yw'r marciau a byddant yn cael eu dyfarnu gan y beirniaid fel a ganlyn

- A Amrywiadau/Confensiynau Enwi **5%**
- B Modiwlau, **subroutines** a gweithrediadau **10%**
- C Prosesu data – cadw, agor, atodi i ffeil, chwilio



		<b>15%</b>	
<b>D</b>	Dilysu a gwirio data	<b>15%</b>	
<b>E</b>	Adeiladu rhaglen	<b>30%</b>	
<b>F</b>	Canfod problemau/datrys problemau/difa bygiau/profi		<b>25%</b>
<b>Cyfanswm</b>			<b>100%</b>

Bydd pob prawf yn cael ei asesu a'i farcio'n annibynnol. Bydd y profion yn cael eu hasesu a'u marcio yn unol â rheolau cyffredinol a phenodol y gystadleuaeth.

Daw'r beirniaid sydd ar y panel o fyd diwydiant, colegau a darparwyr hyfforddiant. Bydd penderfyniadau'r beirniaid yn cael eu cymedroli'n annibynnol a'u sicrhau o ran ansawdd cyn iddynt gael eu cadarnhau.

Gall hyd at 3 cystadleuydd o bob coleg/sefydliad gystadlu.

### Rheolau'r gystadleuaeth

- Dylid diffodd ffonau symudol yn ystod gweithgaredd y gystadleuaeth.
- Ni chaniateir gwranddo ar gerddoriaeth â chlustffonau yn ystod gweithgaredd y gystadleuaeth.
- Dylai unrhyw gwestiynau yn ystod gweithgaredd y gystadleuaeth gael eu cyfeirio at y panel beirniaid.
- Ni ddylai cystadleuwyr gyfathrebu â chystadleuwyr eraill yn ystod gweithgaredd y gystadleuaeth. Cyfrifoldeb pob cystadleuydd yw cyrraedd ar amser ar gyfer sesiwn y gystadleuaeth. Ni fydd amser ychwanegol yn cael ei ganiatáu os fyddwch yn cyrraedd yn hwyr.
- Dylid nodi unrhyw anawsterau technegol i'r panel beirniadu'n syth. Bydd amser ychwanegol yn cael ei ddyfarnu os bydd yr anhawster technegol y tu hwnt i reolaeth y cystadleuydd.

### Manylion cyswllt

#### Prif Gyswllt

Hannah Salter

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