Competition Brief

Competition title
Coding Skills

Competition overview
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.

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

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

Brief
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

Infrastructure List

1 of the following for each competitor (can be grouped or in sets):

Pre-built LEGO Robot Vehicle

PC running Windows 10, complete with keyboard and monitor, capable of running Visual Basic.Net,

Python, C# and Java programming languages

EV3 software downloaded on each PC

Competition rules

Generic 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.

Marking and assessment

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

A Variables/Naming Conventions 5%

B Modules, subroutines and functions 10%

C Data processing –saving, opening, appending to a file,

searching 15%

D Data validation/verification 15%

E Program construction 30%

F Fault Finding/troubleshooting/debugging/testing 25%

Total 100%

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.

Feedback and recognition

Individual and Group verbal feedback will be provided at the end of the competition. (Written feedback will not be provided)

No results or awards will be awarded on the day, as marking will be quality assured.

Certificates of Participation will be issued on the day.

Medallists will be invited to a Celebration Event which will be held on 19th March 2020 at Sophia Hall, Sophia Gardens, Cardiff CF11 9XR from 12pm to 5 pm, where the First, Second and Third Awards will be presented. https://www.sophiagardens.wales/venue/the-sophia-hall.html

Competition Lead

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Briff y Gystadleuaeth

Teitl y gystadleuaeth
Sgiliau Codio

Trosolwg o'r gystadleuaeth
Crynodeb / amlinelliad o gynnwys y gystadleuaeth.

Cynnwys manylion am gymwyseddau craidd

Mae'r gystadleuaeth hon yn canolbwyntio ar yr holl ofynion hanfodol ar gyfer gyrfa lwyddiannus fel rhaglennydd cyfrifiadur mewn unrhyw ddiwydiant.

Mae'r gystadleuaeth hon yn annog rhaglennu ymarferol i ddatrys problemau, a bydd yn profi eich gallu i ddatblygu meddalwedd i fodloni gofynion cwsmeriaid. Bydd cyfres o brofion ar y sgrin yn eich gweld chi'n defnyddio eich sgiliau dadfygio, cod prawf a chreu cymwysiadau newydd. Bydd y gystadleuaeth hefyd yn gofyn i chi raglennu robot *Lego Mindstorms*.

Dylai cystadleuwyr fod yn gyfarwydd gydag un ai:

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

Dylai cystadleuwyr allu:

- Deall a defnyddio GUI & IDE o'u dewis
- Deall cysyniadau Rhaglennu a Yrrir gan Ddigwyddiad (*Event Driven Programming*)

Bydd y tasgau'n gofyn am gwblhau gwaith gan ddefnyddio naill ai Visual Basic.NET, C#, Python **neu** Java sydd ag amgylcheddau datblygu integredig (IDE) ar gael am ddim i'w lawrlwytho'n gyfreithiol.

Meini prawf cystadlu
Mae'r gystadleuaeth hon wedi'i bwriadu ar gyfer y cystadleuwyr hynny sydd wedi astudio neu sy'n astudio Diploma BTEC Lefel 3 neu gyfwerth.

Nifer fesul lleoliad/sefydliad
Gall hyd at 3 cystadleuydd i bob coleg / sefydliad gymryd rhan yn y gystadleuaeth hon

Briff
Cynnwys a gweithgareddau cystadlu penodol ar y diwrnod i'w amlinellu.

Bydd cystadleuwyr yn ymgymryd â chyfres o dasgau ymarferol a fydd yn dangos eu galluoedd a'u sgiliau wrth ddatblygu a chodio meddalwedd.

Bydd briff llawn y gystadleuaeth yn cael ei ddarparu i bob cystadleuydd ar fore'r rhagbrawf.

Mae cwmpas y gystadleuaeth yn ymdrin â phrif nodweddion rôl swydd rhaglennydd cyfrifiadur. Y pedwar cam allweddol yw:

Cynrychiolaeth data a mathau o ddata

Nodi ac egluro'r defnydd o gysonion a newidynnau mewn algorithmau a rhaglenni Defnyddio dynodwyr hunan-ddogfennu, anodi a nodi cynllun rhaglen priodol

Strwythurau data

Creu cod i arbed data o arae (*array*) i ffeil

Creu cod i agor ffeil a darllen y data i mewn i arae (*array*)

creu cod i atodi data o arae i ffeil

Creu cod i arbed data

Dilysu a gwirio data

Dylunio algorithmau ac arferion rhaglennu sy'n dilysu ac yn gwirio data

Datrys Problemau / *Debugging* / Profi

Profi rhaglen neu algorithm er mwyn nodi gwallau posibl

Datblygu Rhaglen

Defnyddiwch ddyluniad wedi'i ddogfennu i gynhyrchu prototeip swyddogaethol (*functional)* i broblem benodol: Cynhyrchu amrywiaeth o sgriniau ac allbynnau (*outputs*) ar gyfer y datrysiad prototeip

Creu system weithredol sy'n cyflawni'r holl brosesau a ddewiswyd

Defnyddiwch ddata realistig ar gyfer allbwn, storio a phrofi

Rhestr Seilwaith

Un o'r canlynol ar gyfer pob cystadleuydd (gellir eu grwpio neu eu gosod mewn setiau):

Cerbyd Robot LEGO wedi'i adeiladu ymlaen llaw

PC sy'n rhedeg Windows 10, ynghyd â bysellfwrdd a monitor, sy'n gallu rhedeg ieithoedd rhaglennu Visual Basic.Net, Python, C# a Java.

Meddalwedd EV3 wedi'i lawrlwytho ar bob cyfrifiadur

Rheolau'r gystadleuaeth

Rheolau cyffredinol y gystadleuaeth

- Dylid diffodd ffonau symudol yn ystod y gystadleuaeth.
- Ni chaniateir gwrando ar gerddoriaeth gyda chlustffonau yn ystod y gystadleuaeth
- Dylid cyfeirio unrhyw gwestiynau yn ystod y gystadleuaeth at y panel beirniaid
- Ni ddylai'r cystadleuwyr gyfathrebu gyda chystadleuwyr eraill yn ystod y gystadleuaeth.

- Cyfrifoldeb pob cystadleuydd fydd cyrraedd ar amser ar gyfer pob rhan o'r gystadleuaeth. Pe baech yn cyrraedd yn hwyr, ni roddir amser ychwanegol ichi.
- Pe bai rhyw wall technegol ar eich offer, dylid rhoi gwybod i'r panel beirniaid yn syth. Bydd amser ychwanegol yn cael ei roi os bydd y gwall y tu hwnt i reolaeth y cystadleuydd.

Marcio ac asesu

Dadansoddiad byr o'r asesiad marcio

Mae pob marc yn wrthrychol a chânt eu dyfarnu gan y beirniaid fel a ganlyn:

A Newidynnau / Confensiynau Enwi **5%**

B Modiwlau, is-reolweithiau a swyddogaethau **10%**

C Prosesu data - arbed, agor, atodi ffeil, chwilio **15%**

D Dilysu / dilysu data **15%**

E Adeiladu rhaglen **30%**

F Canfod Diffyg / Datrys Problemau / *debugging* / profi **25%**

Cyfanswm 100%

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

Mae panel o feirniaid yn dod o ddiwydiant, colegau a darparwyr hyfforddiant.

Adborth a chydnabyddiaeth

Bydd adborth llafar, yn unigol ac mewn grŵp, yn cael ei roi ar ddiwedd y gystadleuaeth. (Ni roddir adborth ysgrifenedig)

Ni fydd unrhyw ganlyniadau na gwobrau'n cael eu dyfarnu ar y diwrnod oherwydd bydd angen sicrhau ansawdd y marcio.

Bydd Tystysgrifau Cyfranogi'n cael eu dosbarthu ar y diwrnod.

Bydd enillwyr medalau'n cael eu gwahodd i Achlysur Dathlu a gynhelir ar 19 Mawrth 2020 yn Neuadd Sophia, Gerddi Sophia, Caerdydd CF11 9XR rhwng 12pm a 5pm, lle y bydd y Gwobrau Cyntaf, Ail a Thrydydd yn cael eu cyflwyno.

https://www.sophiagardens.wales/venue/the-sophia-hall.html

Arweinwyr y Gystadleuaeth

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