



# CYBER SECURITY COMPETITION QUESTIONS

You can answer as many of these questions as you want and in any order.

Any questions not answered will not negatively affect your score.

Each question has a difficulty rating, which will dictate the points you earn.

Only one set of answers (your first submission) from each group will be counted.

It's important you keep your team name secure and only submit your answers when you are ready.

**All entries must be completed in one submission. This means you will not be able to enter your answers in multiple submissions. E.g. answering questions 1-3 today and 4-12 on a different day.**

**It is advised that groups should work on the questions off line and once they are ready to submit, enter their answers here.**

You must submit your answers online in one sitting using this form= <https://tinyurl.com/4kphj467>

**All submission must be made before 8pm on Friday the 18th of October 2024**

1

The grid below contains 144 letters. Start with the red "O" and move from square to square horizontally, vertically and diagonally. Your challenge is to form the longest possible cyber security phrase

M	F	D	I	N	T	D	L	S	P	G	A
A	H	A	R	E	O	E	H	U	G	E	U
P	L	W	O	O	P	P	O	R	Z	T	C
H	P	P	B	Y	E	N	U	I	H	R	V
I	K	E	Y	A	C	K	P	V	E	W	K
L	S	L	R	A	T	N	Q	I	T	N	A
E	O	H	R	T	E	Y	A	L	T	C	B
R	D	C	I	I	G	N	L	W	I	H	E
A	D	X	N	L	O	I	T	A	C	R	N
A	W	V	G	B	L	K	K	V	E	S	C
S	Y	A	R	E	M	E	E	U	A	Q	R
S	P	L	I	B	A	R	T	N	I	T	Y

2

A python program is written to allow a user to enter the radius of a circle as a whole number between 1 and 30, then calculate and output the area of the circle.

Identify the errors and rewrite code that functions.

**Your answer will need to identify the line numbers where the errors are and the correct syntax for the code to be functional.**

**Answers should be separated by commas.**

**You do not need to type in the incorrect syntax.**

Example:

(12) print ("This is correct"), (97) endif



Line number



Corrected code

01 Radius = 0

02 area = 0.0

03 radius = input[Enter radius]

04 if radius <= 1 OR >= 30 then

05 print("Sorry", "that radius is invalid")

06 else

07 area = 3.142 \* (radius ^ 2)

08 print ("area")

09 endlf



3

Eric is at a cashpoint machine and trying to remember his four digit PIN number. He randomly starts pressing buttons and makes the following six incorrect guesses.

9	3	0	7
---	---	---	---

Eric remembers that his PIN number doesn't contain any repeated digits. Considering that in each of Eric's six attempts, he had precisely one correct digit in the correct position, what is his PIN number?

5	7	2	6
---	---	---	---

In Eric's first guess: 9, 3, 0, 7 he had the 3 in the correct position.

4	8	8	2
---	---	---	---

**Your answer will be multiple values separated by commas and will need to be entered as one answer in the text box on the submission form.**

7	3	5	8
---	---	---	---

Example:

9, 0, 7

7	6	2	8
---	---	---	---

1	1	9	1
---	---	---	---

4

Each of the digits 1,3,4,5,6,8,9 is represented by one of the following letters from A to G.

$$A + A = B \quad C + C = DB$$

Use the following number facts to crack the code and find the value of each letter.

$$A \times A = DF \quad C \times C = BD$$

**Your answer will be a value for each letter between A to G and will need to be entered in the text box on the submission form. Each letter and its value should be separated by a comma.**

$$A + C = DE \quad A \times C = EF$$

Example:  
A=16, B=2 etc.

5

You are a Digital investigator who finds a suspicious file on a suspect's computer. It is called "phone\_numbers.pdf".

However, when you go to open it you get an error saying "Windows cannot open this file because it is not a PDF".

One of the senior investigators says they have checked the files magic number which is "FF D8 FF E0":

What is a magic number?

What kind of file is this?

**There are two questions to answer for this question. You will need to enter them in the text box on the submission form separated by a comma.**

Example:

Magic number= A wand, Kind of file= big one



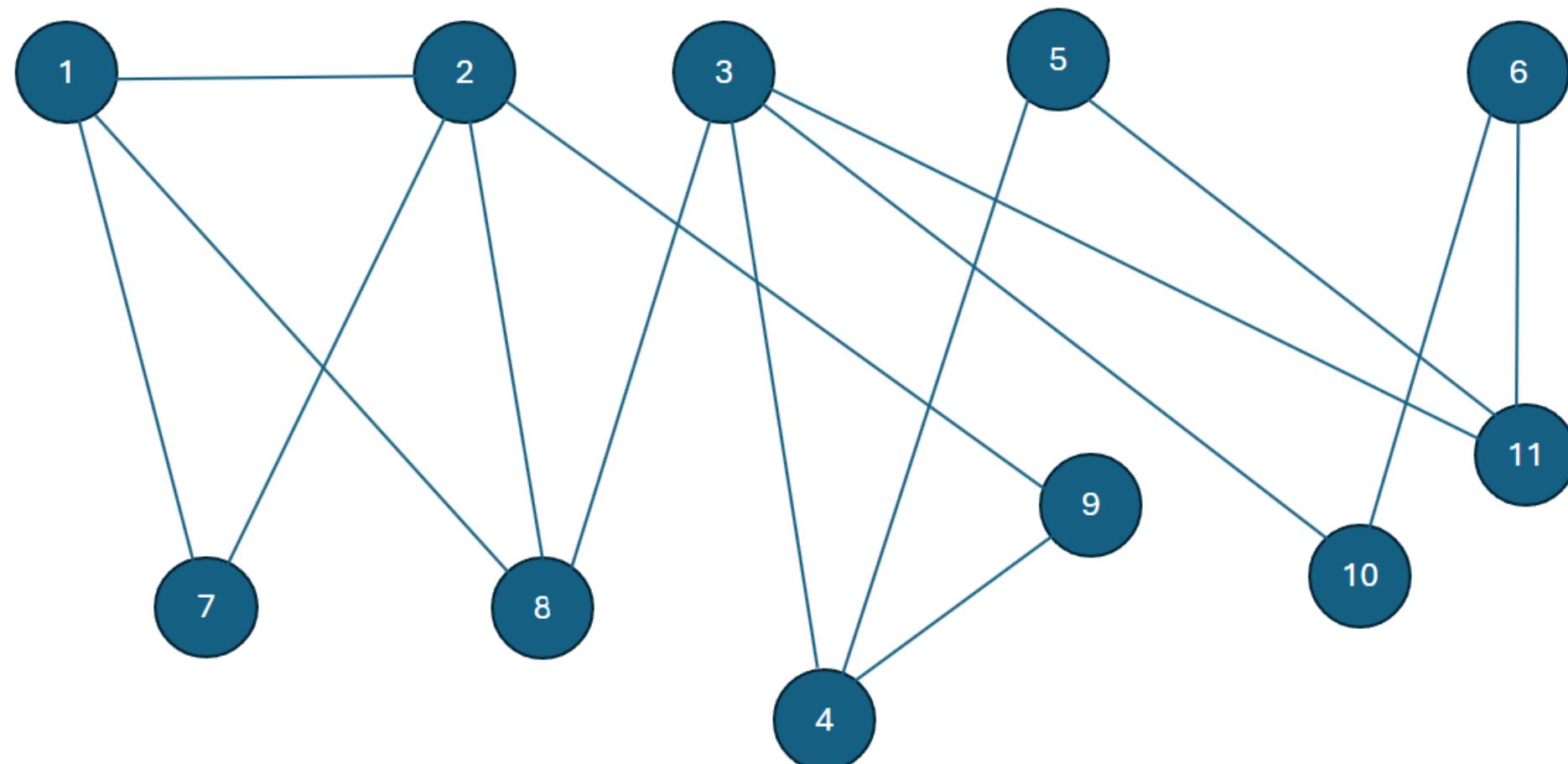
6

A data packet travelling from node 1 wants to visit each node once, going by paths indicated by straight lines how many routes are there for it to select? It must end its journey at node 1 and take no notice of cross routes but go straight from node to node. This is an easy puzzle, if you go *right* way to work.

**Your answer will be multiple values separated by commas and will need to be entered as into the text box on the submission form.**

Example:

9, 0, 7



7

Each of these lines contains a scrambled word plus one additional letter. These extra letters, when read from top to bottom, will reveal an important link that fits with the other words. What is the link word?

INWETRKO

FRWLPEAL

FRTAFCAI

NDTBTOE

RDVREES

CROPRLOTO

GEFOONPSI

BSHCLNIKAOLG

RSETQSESU

**Your answer will be one answer, the link word and typed in the text box on the submission form.**



8

What is the missing letter that has been replaced by a question mark?

1-AEILLWRF

2-URANTIVIS

3-PYCENINRTO

4-CONCESCRTSAOL

5- UTIOCNAHNTAIT?

**Your answer will be one answer and typed in the text box on the submission form.**

9

Can you tell us the tools listed below?

a) 8743b52063cd84097a65d1633f5c74f5

b) Y3liZXJjaGVm

c) 01101110 01101101 01100001 01110000

d) 74 63 70 64 75 6d 70

e) Nvepenpx-at

**Your answers will need to be typed into the text box on the submission form separated by a comma for each answer.**

Example:

A= abcdefg , B=123456 , C= abcdefg etc.

**Bonus points**

What brute forcing tool can you spell out using the first letter of the first word, second letter of the second and so on?

10

Each numbered line of morse code has letters can be split into two terms linked to cyber security that are of the same length. The terms have been scrambled but they read left to right. Translate the morse code.

1/.--. .... .. - . .... - . - - - . .... - - - . .... - . - - - . -

3/.- -...-..-----.-.-.-.-.-.-.-

**Your answers will need to be typed into the text box on the submission form separated by a comma for each answer.**

## Example:

A= abcdefg , ghijk B=123456 , 8765 C= abcdefg, 76tygr etc.

## Bonus points

For the last line, what is the 14-letter missing term at the end which begins with V?

11

An attacker left their encrypted payload on our system – We've almost got the key they used to encrypt and decrypt it using the python script below.

Can you find the missing character and tell us what sort of payload or attack this was?

```
def xor_encrypt_decrypt(data, key):
```

```
return bytes([b ^ key[i % len(key)] for i, b in enumerate(data)])
```

```
key = b'xdfyg_phi'
```

```
payload = b'\x1a\x05\x15\x11GB\x19HW^DI\x1d\x02\x19_\x1c\n\x08KWII_^\x03GIK^I__PXW^U'
```

```
decrypted_payload = xor_encrypt_decrypt(payload, key)
```

```
print(f' Decrypted payload: { decrypted_payload}')
```

**Your answer will be one answer and typed in the text box on the submission form. You are looking for the correct key.**



12

Decode and answer the message located here:

<https://tinyurl.com/2bmha24b>

We would suggest having multiple windows open for this question. 1 window for the website above and any tools you may need and another for this form.

**Your answer will be one answer and typed in the text box on the submission form.**

### REMEMBER

All entries must be completed in one submission. This means you will not be able to enter your answers in multiple submissions.

E.g. answering questions 1-3 today and 4-12 on a different day.

The submission form (where you put your answers) does not auto save answers.

Websites and resources that **might** be useful  
when trying to crack some of these challenges

[CyberChef](#)- GCHQ/NCSC

[Encryption and hashing](#)- Geeks for Geeks

[Encryption and hashing](#)- Medium.com

[Pen testing](#)- Pen test monkey

[Cracking codes](#)- Crack station

[Cyber tools](#)- Kali Linux

[Working with Linux](#)- Geeks for Geeks

[Google maps](#)- Google

[NCSC CyberFirst girls competition example challenges](#)- NCSC

[Cyber Brainteasers](#)- Cyber Security Jobsite.com

[Brainteasers](#)- GCHQ

[Crackthecode](#)- National Geographic

[Cyber challenges](#)- Cyber Start challenges

[PBS Cyber labs](#)- PBS

[Cyber infiltrator](#)- UWE

[Cyber skills challenges](#)- Cyber Skills Live

[Cyber games](#)- National Crime agency