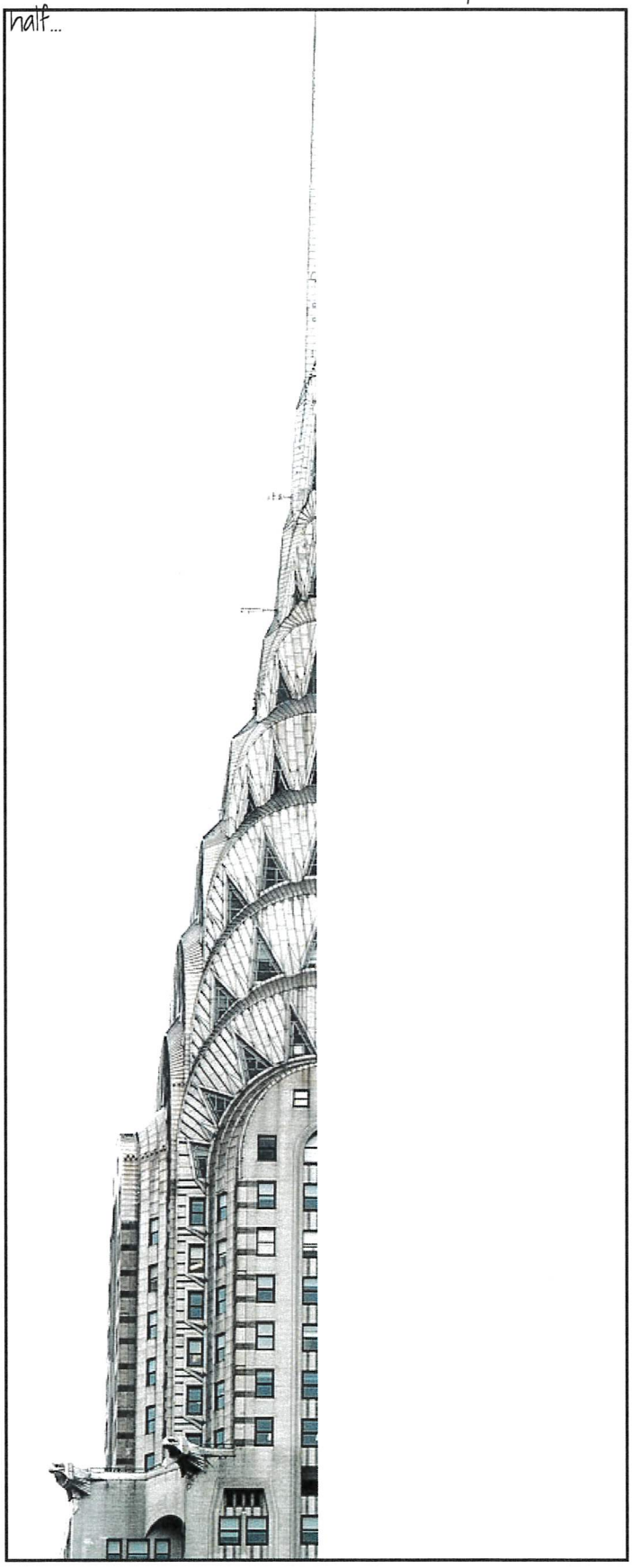
**Year 8 Art Homework 1 :** Draw my other half...



Complete the building by adding in the other half as accurately as you can. Focus on proportion and the tonal qualities you see.
Use a ruler to add guidelines if it will help you.

Can you name the item of architecture?

.....

Name: Class:

# R 19 Computer Security – Methods of Attack - Reading

There are many ways in which computers can be attacked by both other computers and people. This sheet looks at all the methods of attack involving computers.

**WARNING: This sheet discusses ways in which computers and networks are misused. It is illegal to use these techniques yourself.**

## Brute-force attacks

Most computer security relies on a **password**. **Encryption** also relies on a password or **key**. If a user knows the password to a computer system they can often have unlimited ability to misuse it or steal documents or programs. One method of cracking a password is to use a **brute-force attack**. This repeatedly goes through every combination of password. The program tries every letter or number for the first character, and every combination of letter or number for the first and second characters and so on until a password is found. A computer can do this very quickly for short passwords, but takes more time if the password is long. To help prevent brute-force attacks, software will often disable access, even with the correct password, after a certain number of failed attempts.

To make passwords hard to crack with a brute-force attack you should make sure you use a long password which uses many different characters. For instance, if we use uppercase and lowercase letters with numbers we have 26+26+10=62 different characters to choose from. If the password is 10 characters long then it will have $62^{10}$ different combinations. This is 839 million billion different combinations and will take a computer a long time to find the answer. It is important not to just use a common word as a **dictionary attack** would easily find this. This method of attack tries every word in a dictionary to crack the password and needs only around 100,000 comparisons.

## Denial of service attacks

Networks allow client computers to send **requests** to servers. These must be processed, which normally requires more processing than sending the request did. If too many requests are sent for the server to handle then the server will not be able to respond. This will leave either a slow service or no service at all. One way of carrying this out is to perform a **ping flood** where many **ping packets** are sent to a computer which it then has to respond to. If the computer can send the packets faster than the other computer can receive and reply to them then there will be no processing power left for anything else. It is easy to prevent a denial of service attack from one computer by blocking the IP address of the computer sending the packets. However, if many computers are sending the packets it becomes a lot harder. This is known as a **distributed denial of service attack**.

## SQL injection

**SQL statements** are used to **select** and **delete** information from a database. The statement

*DROP TABLE users;*

would delete every user in a table called users. To select a user's date of birth from a social network a website might execute the SQL code:

userDetails = "SELECT * FROM users WHERE name=" + username + ";"

This statement would replace the variable *username* with whatever the user typed into the website. If instead of a username the user typed

*a'; DROP TABLE users*

then the following query would be used:

SELECT * FROM users WHERE name=a; DROP TABLE users;

The whole users table would be deleted as a result. This type of attack is known as an **SQL injection**. It involves injecting SQL code into variables so that they are run on the database server. Prevention of this attack is by carrying out very careful **validation** of any data input to **variables**.

Name: _____

# Computer Security – Methods of Attack - Questions

**Q 19**

1. Match the type of attack on the left with the explanation on the right.

| | |
|---|---|
| Brute-force | Make SQL code execute in a variable |
| Denial of service | Try every password combination |
| SQL injection | Send too many requests to a server |

[3]

2. Which of the following will make a password stronger? Tick **three** boxes.

- ❑ A longer password
- ❑ Using upper and lowercase letters
- ❑ A shorter password
- ❑ A common word
- ❑ Something easy to remember
- ❑ Using special characters or numbers

[3]

3. When a denial of service attack occurs on a website what are other users likely to experience? Tick **two** boxes.

- ❑ They won't notice it but the data will be harmed in the database
- ❑ The website will slow down
- ❑ Abusive text will appear where hackers have changed the homepage
- ❑ The website may crash and either nothing or an error page appears

[2]

4. SQL injection affects what type of servers? Fill in **one** circle.

- ❍ Print servers
- ❍ Email servers
- ❍ Database servers

[1]

5. How can SQL injection be prevented? [1]

_____

10

6. Complete the text below with the words beneath.

Passwords need to be sufficiently difficult that a computer cannot crack them. The simplest form of attack is to try every combination of password. This is known as a _____. Using a mixture of uppercase and lowercase letters along with numbers and special characters will make it harder to crack the _____ as there will be many more possibilities for each character. Using a single _____ is not suitable as a computer can try every word in the dictionary. This is known as a _____. [4]

**password** **English word** **dictionary attack** **brute-force attack**

7. A password uses uppercase and lowercase letters along with numbers.

a) How many possibilities are there for each character in the password?

_____ [1]

b) If the password is eight characters long, how many combinations are there? _____ [1]

8. A password makes use of three simple English words chosen from a dictionary with 10,000 words in it. How many combinations are there for the password? _____ [1]

9. It is possible for a computer to send Ping packets as fast as possible to another computer or server. What is this process called? _____ [1]

10. If many computers on the Internet try to flood a server with requests this will cause the server to slow down or stop working. This is what kind of attack? _____ [1]

11. The following SQL query is written where *username* is a variable. This variable takes information from a username text field on a website.

SELECT * FROM hobbies WHERE name=" + username + ";"

A user enters the following username: *w'; DROP TABLE hobbies*

What happens to the table hobbies? _____ [1]

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