



F10.7 Protocols

Networks · GCSE · OCR J277 1.3.2, AQA 8525 3.5, Edexcel 1CP2 4.1.6 ·
about 15 min

What this lesson is about

Standards, and TCP, UDP, IP, HTTP, HTTPS, FTP, SMTP, POP and IMAP.

- Standards
- The protocols on the exam
- Requests and responses

Questions

6 marks in all

1. Which protocol sends email to a mail server?

[1 mark]

- ☐ A SMTP
- ☐ B IMAP
- ☐ C POP
- ☐ D HTTP

Answer: A. SMTP sends; POP and IMAP retrieve.

2. Why is HTTPS used for logins and payments?

[1 mark]

- ☐ A The data is encrypted, so it cannot be read if intercepted
- ☐ B It is faster than HTTP
- ☐ C It compresses the page
- ☐ D It stops the page loading twice

Answer: A. The S is for secure.

3. How is IMAP different from POP?

[1 mark]

- ☐ A IMAP keeps email on the server so it stays in sync on every device
- ☐ B IMAP sends email; POP receives it
- ☐ C IMAP is for files; POP is for email
- ☐ D There is no difference

Answer: A. POP usually downloads and removes email from the server.

4. Why are standards needed?

[1 mark]

- ☐ A So equipment and software from different makers work together
- ☐ B So all devices are made by one company
- ☐ C So networks are faster
- ☐ D So data is encrypted

Answer: A. A phone from one maker can use a router from another.

5. Which protocol is used to transfer files between computers?

[1 mark]

- ☐ A FTP
- ☐ B SMTP
- ☐ C IMAP
- ☐ D UDP

Answer: A. File Transfer Protocol.

6. What does this program print?

[1 mark]

```
reply = "404 Not Found"
code, rest = reply.split(" ", 1)
print(int(code) == 200, rest)
```

Answer:

False Not Found

404 is not 200; the rest is Not Found.

The task: a tiny web client

Write `request(path)`, which sends `GET <path>`, waits up to a second for the reply, and returns the status code as a number and the rest of the reply as text. Request `/battery`, `/camera` and `/lights`. For a status of 200, print `<name>: <rest>` (for example `battery: 87`, without the `OK`); otherwise print `<name>: error <status>`. Turn the LED green if the battery is above 50, and red if not.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()
```

The hint students can ask for: Send the request and wait for the reply. The reply starts with the status number, so split it off the front and turn it into a number; what is left is the body. Choose what to print from the status.

A solution

```
from bugbot import *
connect()
def ask(question, seconds=1.0):
    send(question)
    for tick in range(int(seconds * 10)):
        wait(0.1)
        for sender, text in messages():
            return text
    return None

def request(path):
    reply = ask("GET " + path)
    code, rest = reply.split(" ", 1)
    return int(code), rest

battery = 0
for name in ["battery", "camera", "lights"]:
    status, rest = request("/") + name)
    if status == 200:
        value = rest.split(" ", 1)[1]
        print(f"{name}: {value}")
        if name == "battery":
            battery = int(value)
    else:
        print(f"{name}: error {status}")
if battery > 50:
    led(0, 255, 0)
else:
    led(255, 0, 0)
```

Any program that meets the task's checks is marked correct in the simulator; this is one way, not the only way.