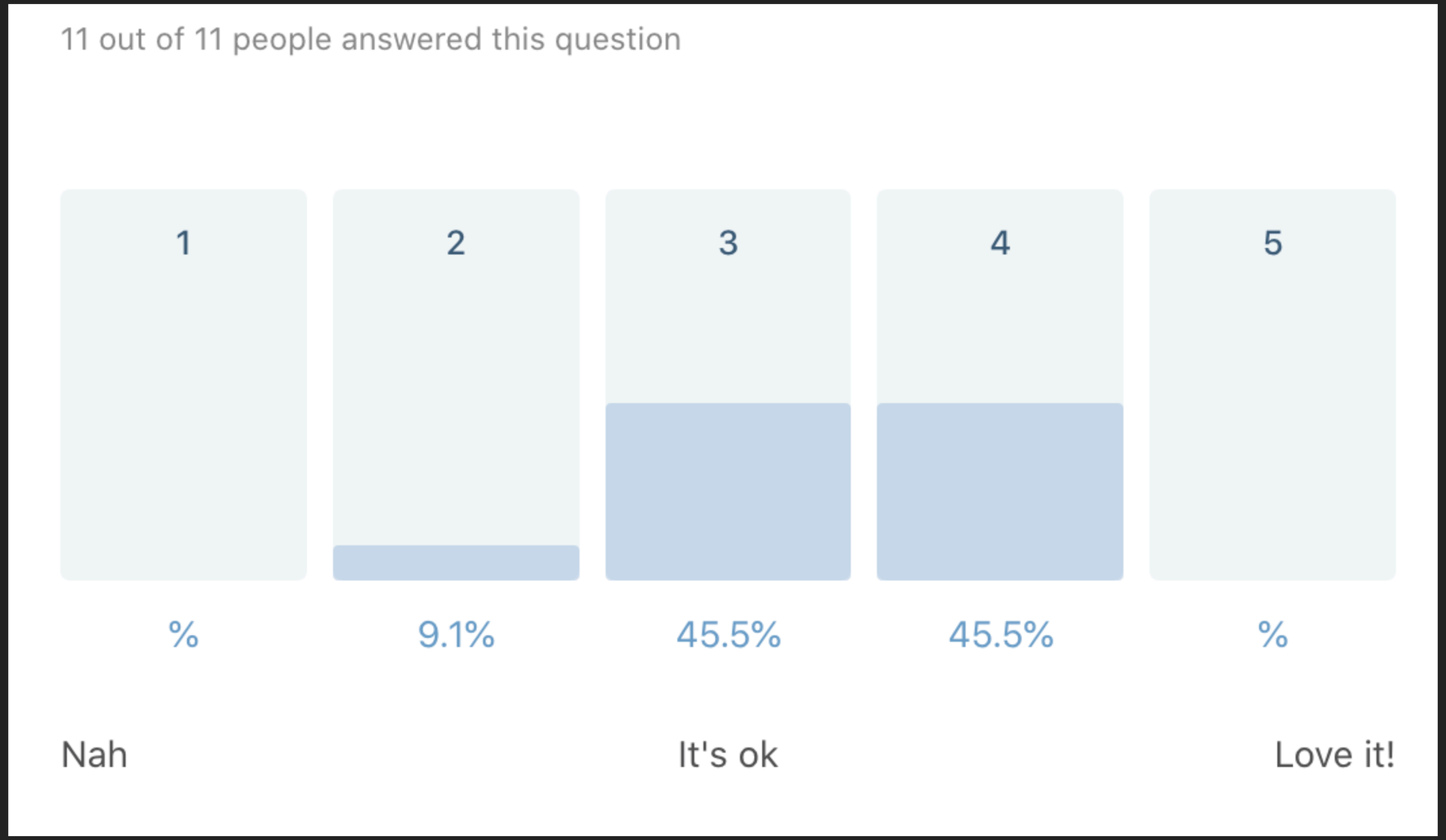
SEPTEMBER 30TH 2020

ELEMENTARY PROGRAMMING

SOME COVID BEST PRACTICES BEFORE WE START

- If you fill ill, go home
- Keep your distance to others
- Wash or sanitise your hands
- Disinfect table and chair
- Respect guidelines and restrictions

FEEDBACK CHECK



FEEDBACK

- Can you do some whiteboard?
  - Unfortunately with Covid we have half of the class on Zoom and half on site. If something is not clear please ask.
- We do too many things in one lesson!
  - This is true, I tried to keep a steady number of chapters from the book, if you do the regular assignments given in the semester plan you should be fine

NEW FEEDBACK

- I would really like for you to take a survey at the end of the session
- Feedback is important, please take the time to do it
- Pretty please <3
- Type this in your browser http://bit.ly/elemprog5

READ AND WRITE TO A FILE

- Disclaimer: you need to trust me on some of what you will see today, we will look into pointers starting next week
- We need this to be able to do the first assignment that counts towards the final grade

READ FROM A FILE

```
FILE *fp = fopen(filename, “r")
```

- When we open a file we need to tell to the library where the file is
- `filename` can be a relative path or an absolute path in your filesystem
- For example `/Users/emanueleianni/text.txt` is absolute path

READ FROM A FILE

```
FILE *fp = fopen(filename, “r")
```

- We need to tell to the program with which kind of permission we want to open a file

String	*Meaning*
`"r"`	Open for reading
`"w"`	Open for writing (file need not exist)
`"a"`	Open for appending (file need not exist)
`"r+"`	Open for reading and writing, starting at beginning
`"w+"`	Open for reading and writing (truncate if file exists)
`"a+"`	Open for reading and writing (append if file exists)

READ FROM A FILE

```
FILE *fp = fopen(filename, “r")
```

- We assign the opened file to a pointer
- FILE is a typedef that describe the type of what is a pointer to a file
- It’s like time_t from last lesson
- For now ignore the *, you need to trust me. It basically means fp contains the address in memory

READ FROM A FILE

```
FILE *fp = fopen(filename, “r")
```

- The reason to have a pointer is because a file can be big
- It could not fit in memory
- So we need a way to consume it in small chunks
- FILE keeps in memory all this information
- Other functions will use FILE information to read or write to the file in specific places

READ FROM A FILE

```
NAME    AGE    CITY
abc     12     hyderbad
bef     25     copenhagen
cce     65     bangalore
```

This is the content of a file called text.txt

- There are many functions that allows you to read from a file but we will just see one
- To read the first line:

```
    char ageTitle[100];
    char buffer[MAXCHAR];
    fgets(buffer, MAXCHAR, ptr);
    sscanf(buffer, "%*s %s %s", ageTitle, cityTitle)  ;
```

READ FROM A FILE

```
    char ageTitle[100];
    char buffer[MAXCHAR];
    fgets(buffer, MAXCHAR, ptr);
    sscanf(buffer, "%*s %s %s", ageTitle, cityTitle)  ;
```

- First thing we need to define where in memory put the values
- So we define to arrays of char of max size 100
- This means that the content cannot be greater than 100 chars per variable

READ FROM A FILE

```
    char ageTitle[100];
    char buffer[MAXCHAR];
    fgets(buffer, MAXCHAR, ptr);
    sscanf(buffer, "%*s %s %s", ageTitle, cityTitle)  ;
```

- `fgets` accepts the pointer to the buffer where we put the content in memory, the maximum chars to read
- `fgets` returns an integer that tells you if it's end of file (EOF)

READ FROM A FILE

```
    char ageTitle[100];
    char buffer[MAXCHAR];
    fgets(buffer, MAXCHAR, ptr);
    sscanf(buffer, "%*s %s %s", ageTitle, cityTitle)  ;
```

- `sscanf` can ignore things we don't want, we use the *
- In this case we are saying we will ignore the name ("%*s")
- And we want title and city ("%s %s")
- So "%*s %s %s" means, ignore first string you match, give me the next two

READ FROM A FILE

```
    char ageTitle[100];
    char buffer[MAXCHAR];
    fgets(buffer, MAXCHAR, ptr);
    sscanf(buffer, "%*s %s %s", ageTitle, cityTitle)  ;
```

- `fgets` will stops reading when:
  - it encounters End Of File (`EOF`)
  - a new line (`\n`)
  - MAXCHAR chars are read
- How do we read the next line?
  - Simple: we call `fgets` again

READ FROM A FILE

```
NAME    AGE    CITY
abc     12     hyderbad
bef     25     copenhagen
cce     65     bangalore
```

- After we read the first line, the rest of the lines are always the same in pattern, so we can use a loop:

```
    char city[100];
    int  age;
      while(fgets(buffer, MAXCHAR, ptr)) {
        sscanf(buffer, "%*s %d %s ", &age, city);
        printf("%s\t%d\n", city, age);
    }
```

READ FROM A FILE

```
    char city[100];
    int  age;
      while(fgets(buffer, MAXCHAR, ptr)) {
        sscanf(buffer, "%*s %d %s ", &age, city);
        printf("%s\t%d\n", city, age);
    }
```

- `fscanf` returns an integer that can be:
  - An integer >= 0 saying how many match we have
  - EOF in case of end of file (it's a negative integer)

WRITE TO A FILE

```
    char city[100];
    int  age;
      while(fgets(buffer, MAXCHAR, ptr)) {
        sscanf(buffer, "%*s %d %s ", &age, city);
        fprintf("%s\t%d\n", city, age);
    }
```

- `fprintf` works exactly as printf
- The only difference is that you need to pass a pointer
- Notice that it's not the same point, we opened another file (we will see it better in an example)

ALWAYS REMEMBER TO CLOSE THE FILE

```
fclose(ptr);
```

- Close the damn file!
- If you leave it open you will have memory leaks

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ASSIGNMENT

- You have almost 4 weeks to complete it.
- It’s available on DTU inside
- Ask questions to me or TA during the two hours workshop

EXAM INFO

- It will be a set of example codes
- You need to tell what is right and what is not
- You will need to complete the code so that it will compile with no error

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