Solutions and commentary for exam 2023-04-13 in DA2005

Part A: multiple choice

1. *B*

2. *C*

3. *C*

4. *E*

5. *A, C, E*

6. *A*

7. *A,B,D,E,F*

8. *D*

Part B: coding questions

9.

A. Example solution:

```
def contains_substring(lis, n):
    l2 = []
    for elem in lis:
        if n in elem:
            l2.append(elem)
    return l2
```

B. Example solution:

```
def contains_substring(lis, n):
    l2 = []
    for i in range(len(lis)):
        try:
            if n in lis[i]:
                l2.append(lis[i])
        except:
            print('invalid datatype at index:', i)
    return l2
```

10. We need to write `for i in range(len(line)):` for Python to accept the code. The second error is a logical error, it should be `line[0:i]` instead of `line[i:]`

11. Example solution:

```
def substring_abundance(s, k):
        d = {}
        for i in range(len(s)-k+1):
                kmer = s[i:i+k]
                if kmer not in d: # new entry
                        d[kmer] = 0
                d[kmer] = 1
        return d
```

12. Example solution:

```
def most_abundant(s, k):
        all_kmer_ab = substring_abundance(s, k)

        # find max abundance
        max_ab = 0
        for kmer, ab in all_kmer_ab.items():
                if ab > max_ab:
                        max_ab = ab

        # get all max abundance
        d = {}
        for kmer, ab in all_kmer_ab.items():
                if ab == max_ab:
                d[kmer] = ab
    return d
```

13. Example solution:

```
def read_numbers():
    numbers = []
    while True:
        ans = input("Skriv ett tal: ")
        if ans == 'quit':
            return numbers
        n = int(ans)
        if n in numbers:
            print("Talet finns redan")
            continue
        else:
            numbers.append(n)
    return numbers
```