

minor programmeren

Proeftentamen Programmeren 1

Schrijf je naam en studentnummer op de regel hieronder.

Je mag de vragen in Engels of Nederlands beantwoorden.

Dit is een "gesloten boek"-tentamen. Je mag voor het invullen je pen of potlood gebruiken, maar verder niets. Schrijf duidelijk en niet te groot.

Leg je studentenkaart (of ander ID met foto) klaar op je tafel. We komen langs om te kijken of je hierboven je naam hebt ingevuld en of deze klopt met je ID.

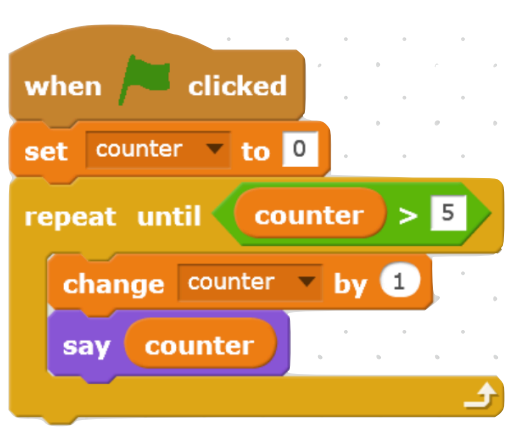
Laat het weten als je kladpapier nodig hebt.

Als je vragen hebt over hoe we iets bedoelen, dan kunnen we dat waarschijnlijk niet beantwoorden zonder een deel van het antwoord weg te geven (maar voel je vrij om het te proberen!).

Je hoeft geen comments in je code te schrijven. Je mag alle aangeleverde functies uit de lectures of de opdrachten gebruiken in je antwoorden. Pseudocode kan ook punten opleveren, maar doorgaans minder dan "echte" code!

Looping back to Scratch.

0. (5 points.) Consider the Scratch script below.



In the space below, complete the translation of this Scratch script to a C program in such a way that its output is equivalent. (Your program's *structure* needn't be equivalent.) Assume that **counter** is an `int`, that **say** is `printf`, and **change** means to increment or decrement. Output `\n` after each line of text.

```
#include <cs50.h>
#include <stdio.h>

int main(void)
{
```

Quick questions

1. (2 points.) What will be printed if we run the following code?

```
int a = 3;
int b = 6;

if (a < b)
{
    printf("This ");
}
if (a < 5)
{
    printf("is ");
    a = 8;
}
else
{
    printf("Sparta!");
}
```

2. (2 points.) What will be printed if we run the following code?

```
int n = 0;
for (int i = 1, step = 1000; i < 5; i++)
{
    n = n + (step * i);
    step = step / 10;
}
printf("%d\n", n);
```

3. (2 points.) What will be printed if we run the following code?

```
string s = "btsdfbhessbeb sdfbrimbea sxbsciqlbuq werblpm cnzbt";

for (int i = 1, n = strlen(s); i < n; i++)
{
    if (s[i - 1] == 'b')
    {
        printf("%c", s[i]);
    }
}
printf("\n");
```

4. (2 points.) What will be printed if we run the following code? Note that we used `char s[]` instead of `string s`, allowing us to change the string's characters.

```
char s[] = "H knud bgddrd!";

for (int i = 0, n = strlen(s); i < n; i++)
{
    if (isalpha(s[i]))
    {
        s[i] = s[i] + 1;
    }
}

printf("%s\n", s);
```

5. (2 points.) What will be printed if we run the following code?

```
int trap(int n)
{
    return n / 2;
}

int watch(int m)
{
    return trap(m + 2);
}

int main(void)
{
    int n = 8;
    printf("%d\n", watch(n) + n);
}
```

6. (2 points.) What will be printed if we run the following code?

```
char s[] = "The\0Blues\0Brothers";

// note: %lu is like %i
printf("%lu\n", strlen(s));
```

Sort it out yourself

Consider the procedure (in pseudocode) for performing some sorting algorithm on an array with length n :

(pseudocode removed, try it with some sorting algorithms!)

7. (2 points.) Perform the procedure on the array below, printing after each iteration in the procedure the state of the array.

(scribble version)

| | | | | |
|----|---|---|----|---|
| 22 | 6 | 2 | 18 | 1 |
| | | | | |
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| | | | | |
| | | | | |
| | | | | |

(final version)

| | | | | |
|----|---|---|----|---|
| 22 | 6 | 2 | 18 | 1 |
| | | | | |
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Research tool

We're working on a program that can count the number of full sentences in a string. Any sentence that ends with a full stop (.) may be counted as a "full sentence".

8. (5 points.) In the program below, write the function that does the counting. Make sure that `count_sentences` does indeed return the number of full sentences in the string `text`.

```
#include <stdio.h>
#include <cs50.h>
#include <string.h>

int count_sentences(string text);

int main(void)
{
    string text = "I did not hit her. It's not true. It's bullshit. I did not hit her. I did not. Oh, hai Mark.";
    printf("%d", count_sentences(text));
}

int count_sentences(string text)
{
    // TODO

}
```