Computer architecure

Amdahl's law

Tasks:

```
.global _start
_start:



mov r0,#0
mov r5,#0

loop1:
add r0,r0,#1
add r5,r5,#1
cmp r0,#1024
blt loop1
mov r0,#0

loop2:
add r0,r0,#1
add r5,r5,#1
cmp r0,#2048
blt loop2
mov r0,#0

loop3:
add r0,r0,#1
add r5,r5,#1
cmp r0,#4096
blt loop3
mov r0,#0

loop4:
add r0,r0,#1
add r5,r5,#1
cmp r0,#1024
blt loop4
mov r0,#0
```

Amdahl Law

$$S_{max} = \frac{1}{(1-p)+\frac{p}{s}}$$

Amdahl's law formula calculates the expected speedup of the system if one part is improved. It has three parts: S_{max}, *p, and s.*

S_{max} is the maximum possible improvement of the overall system. It is expressed as a decimal greater than 1. If the operation is improved to be done in half the time, S_{max} = 2. Higher means a greater improvement.

p is the part of the system to be improved, expressed as a number between 0-1. If the part is 45% of the system, *p* = 0.45.

s is the improvement factor of *p*, expressed by how many times faster *p* can be done. If it can be done in 1/3rd the time, then *s* = 3.

Essentially, the equation subtracts out the part to be improved, then puts it back in after it has been improved.

Thank you for your attention!