Fun with Functions

ESC101: Fundamentals of Computing

Purushottam Kar

Announcements

- No tutorial this week (Students Gymkhana holiday)
  - Doubt clearing session: Friday 26 October 6PM KD101
  - Students of all sections welcome to doubt clearing session
  - Tutorial sheet will still be released on website – read it!
- AT mid-term presentations this week – see schedule!
- Next week – major quiz and end sem lab exam
  - Refer to course calendar on course website to clarify dates

The 6 Golden Rules of Functions

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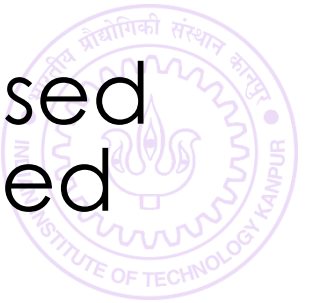

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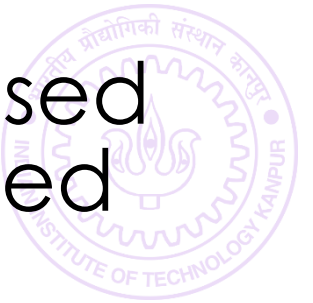
WARNING: may cause loss of information or unexpected behavior



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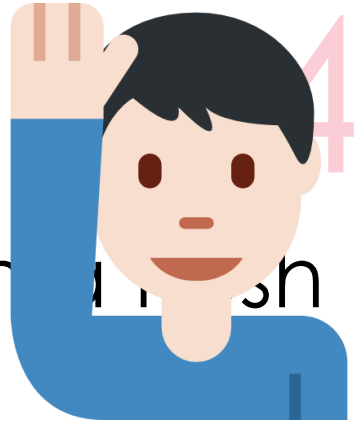

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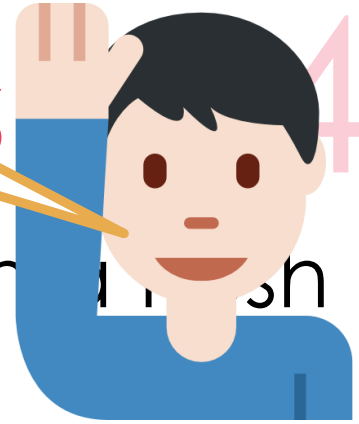

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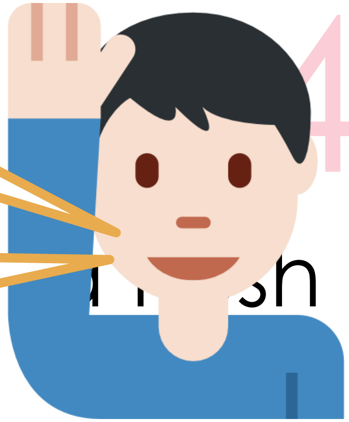

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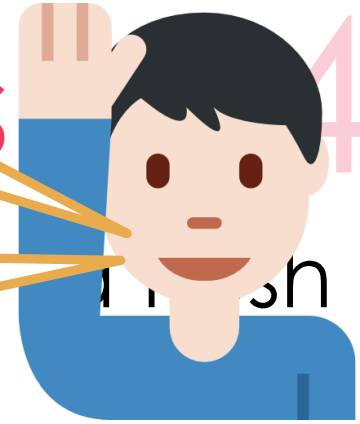

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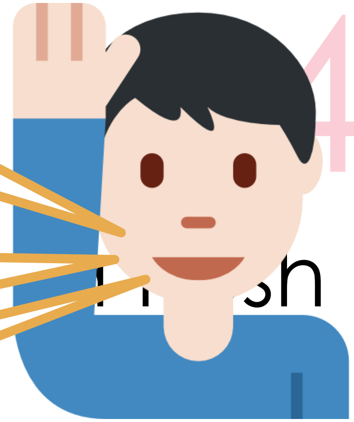

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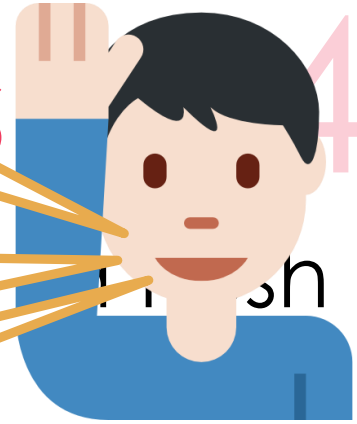

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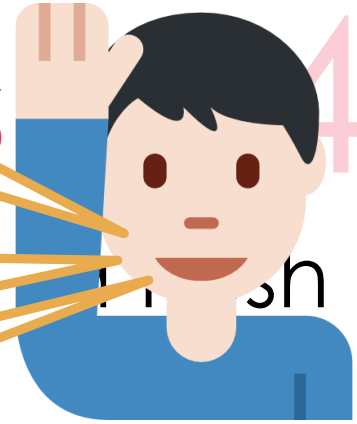

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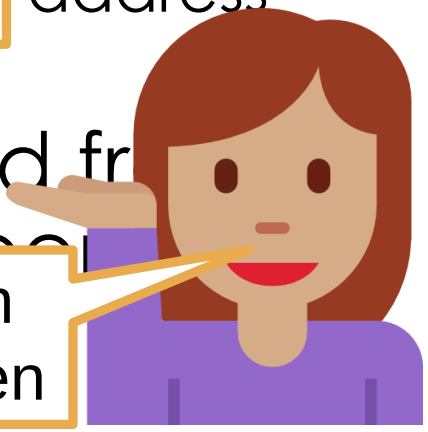

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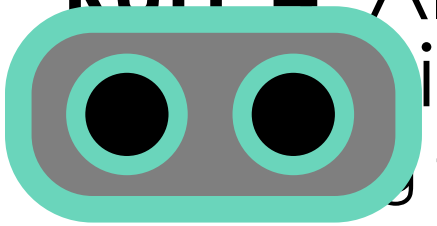

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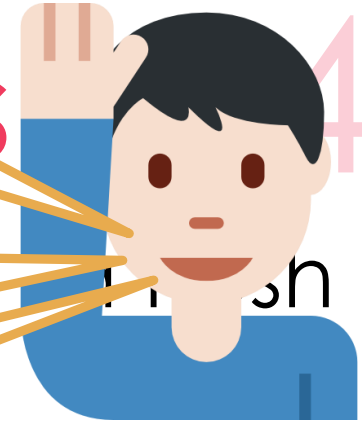

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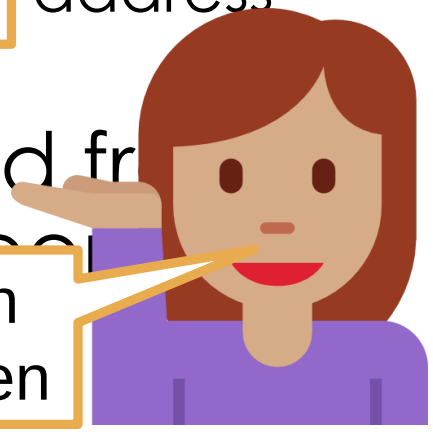

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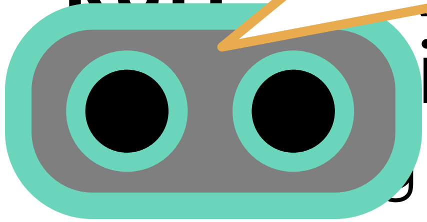

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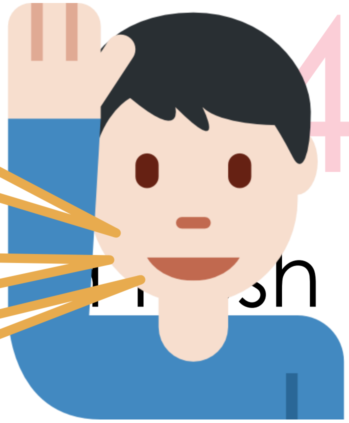

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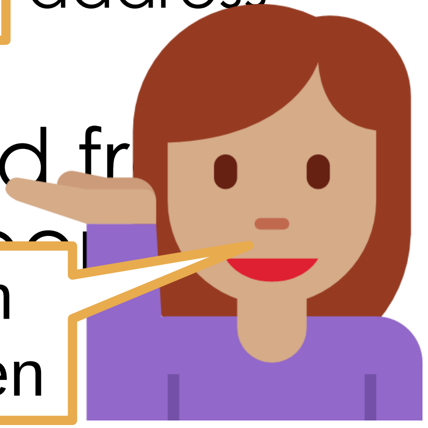

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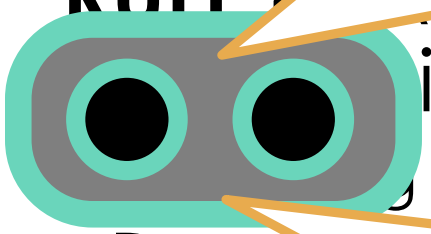

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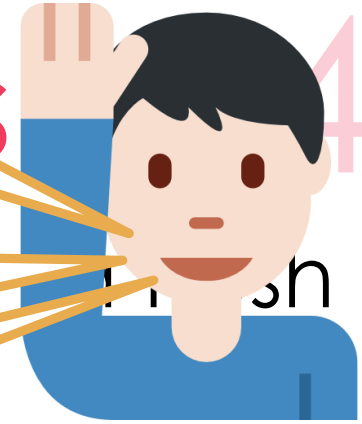

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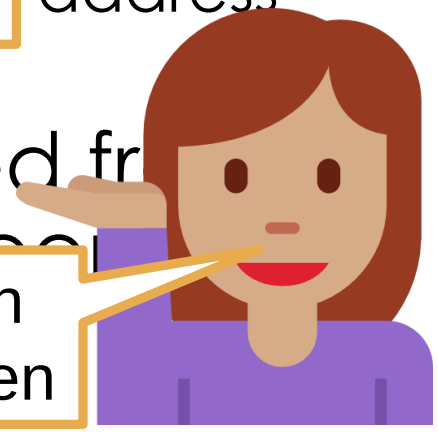

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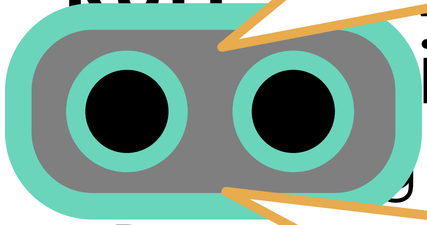

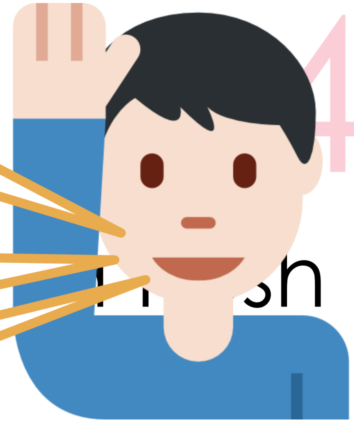

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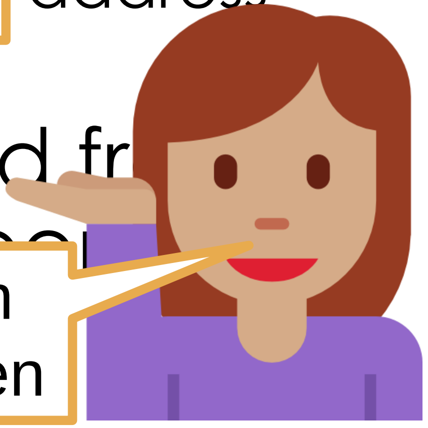

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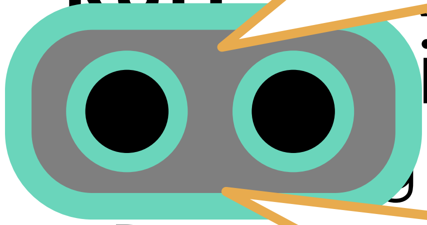

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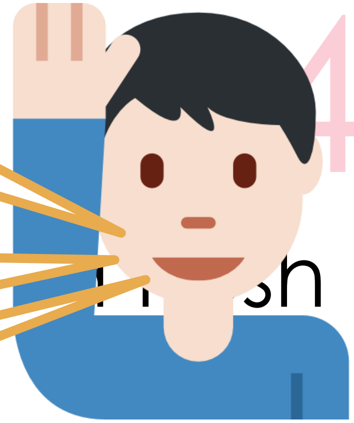

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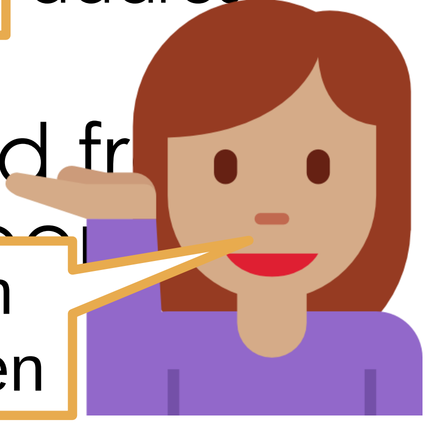

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Let us look at this rule more closely

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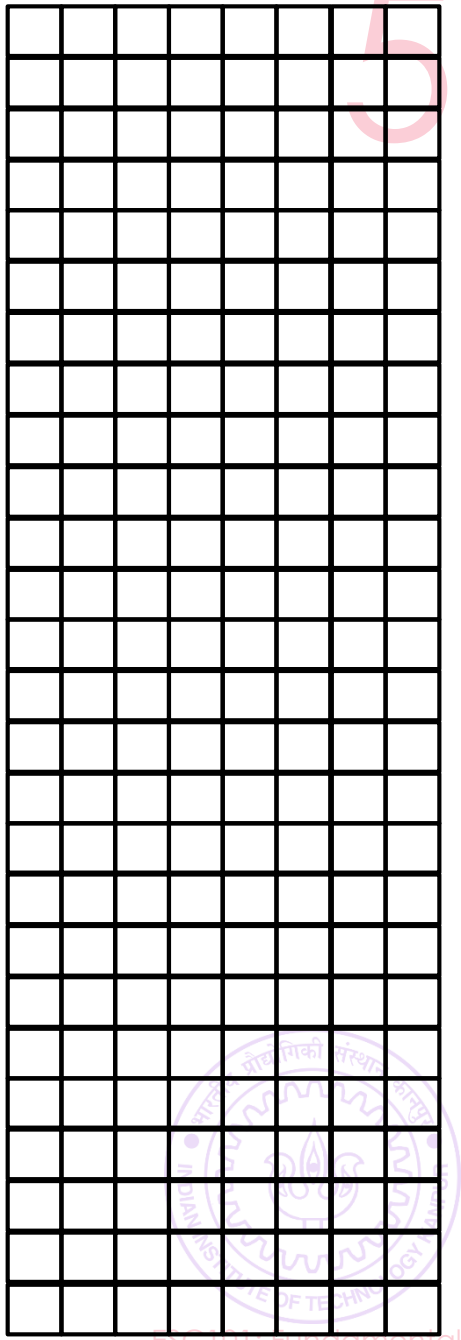

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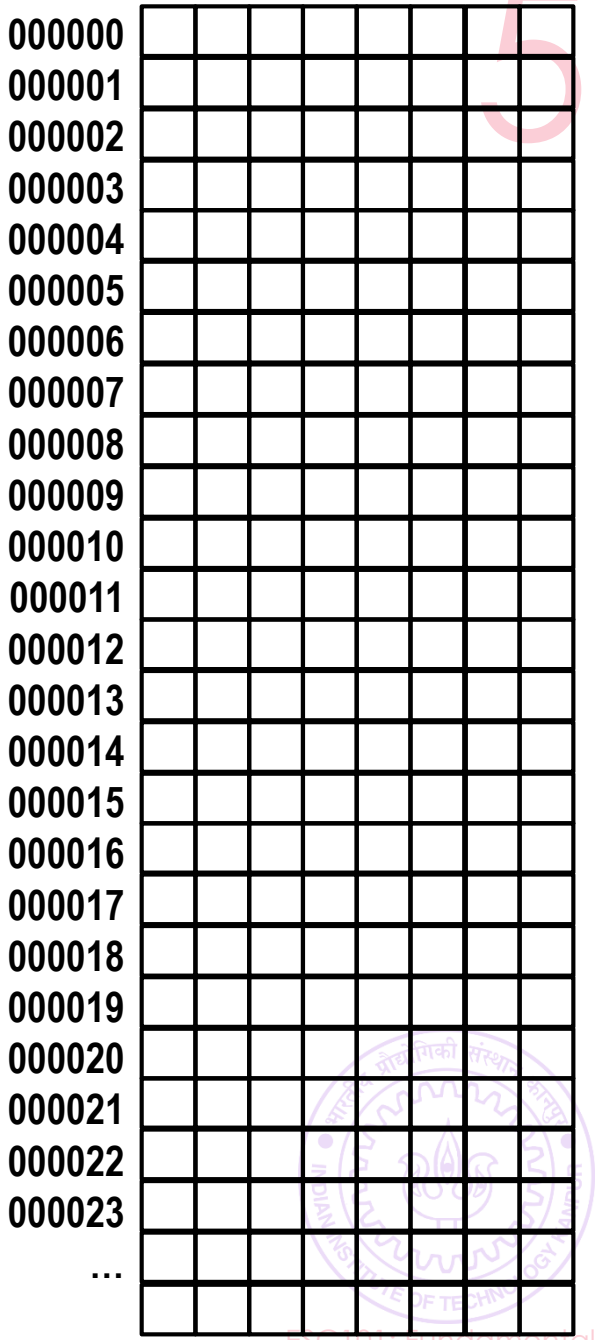

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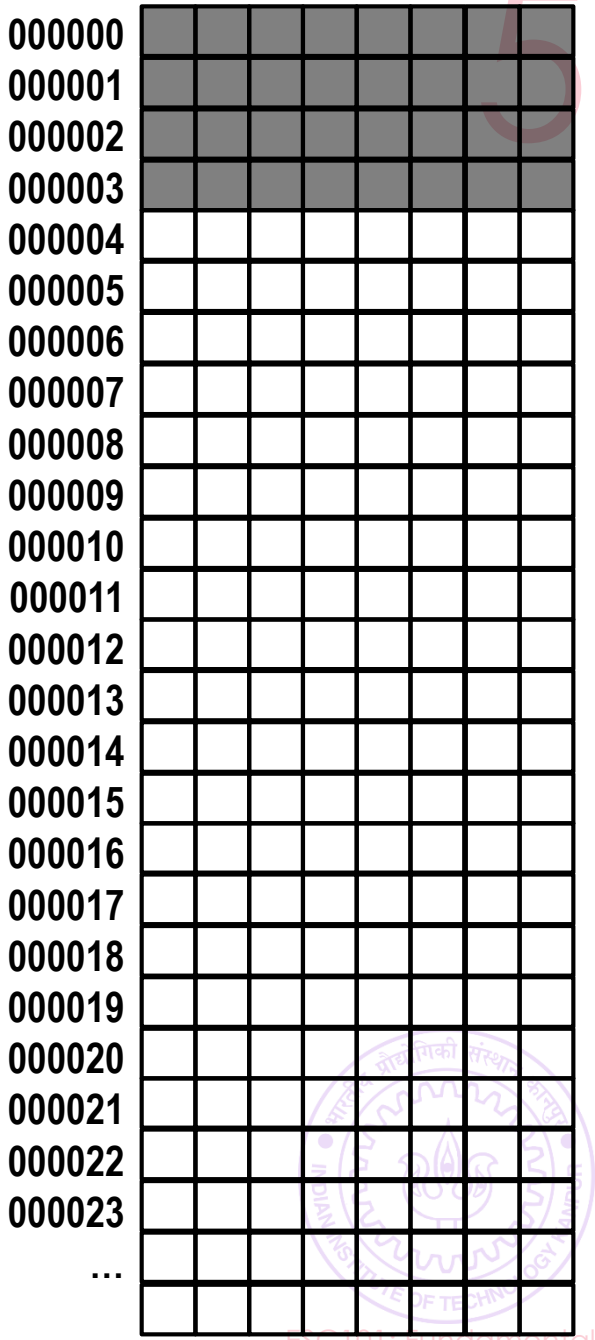

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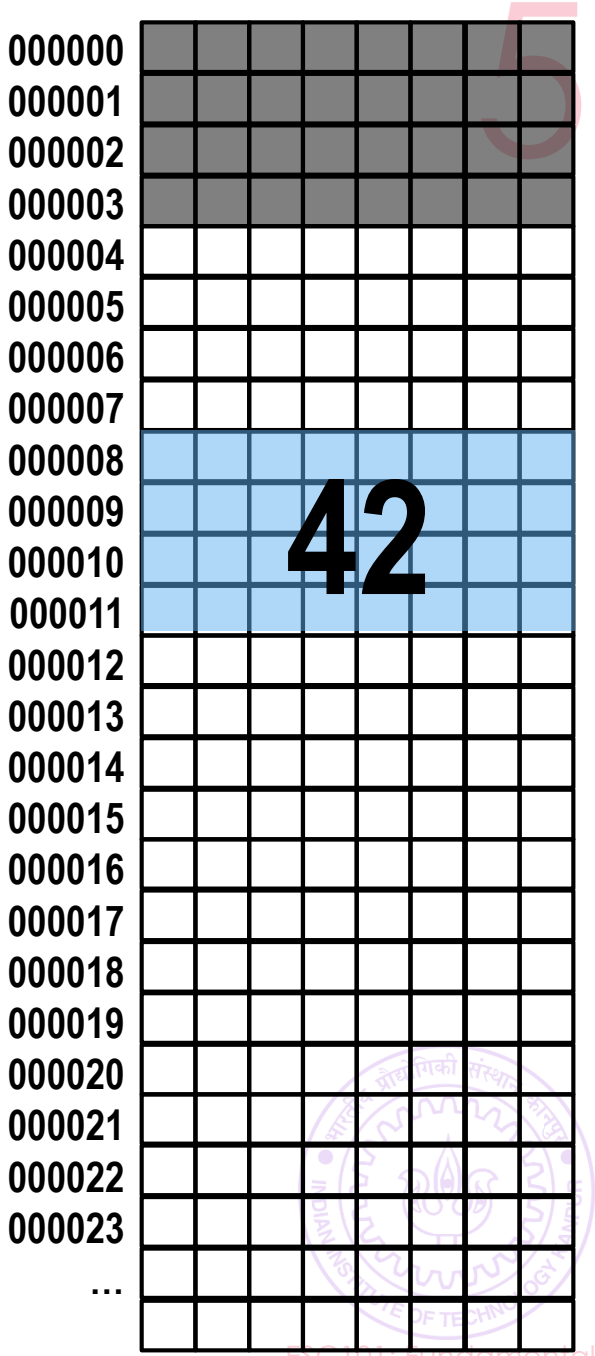

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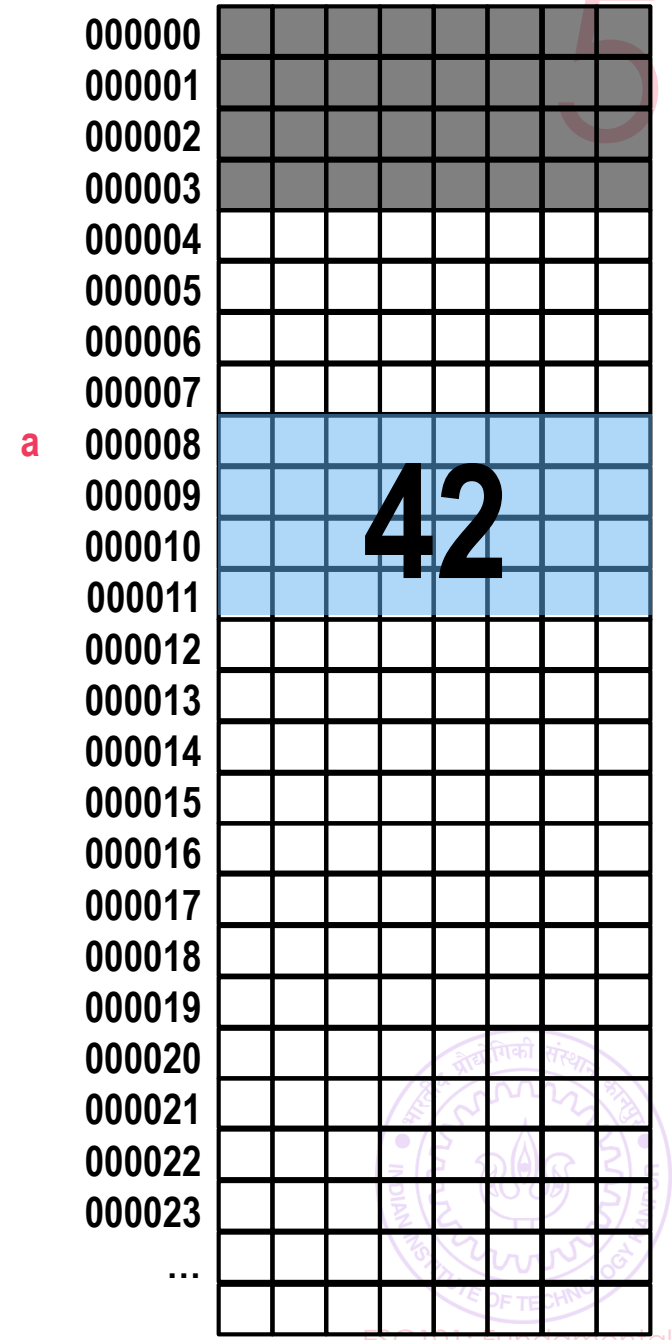

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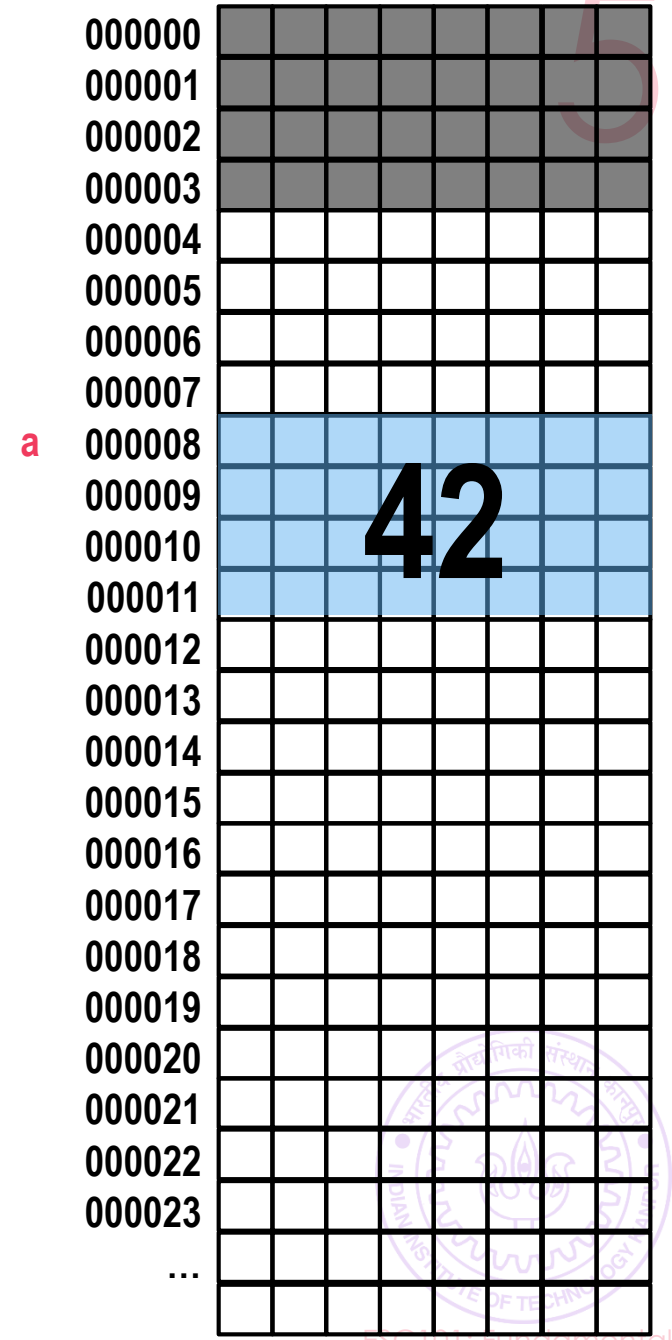

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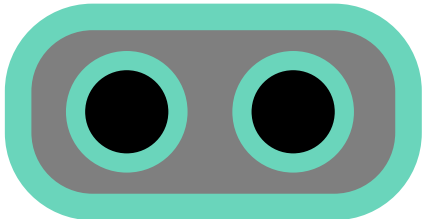

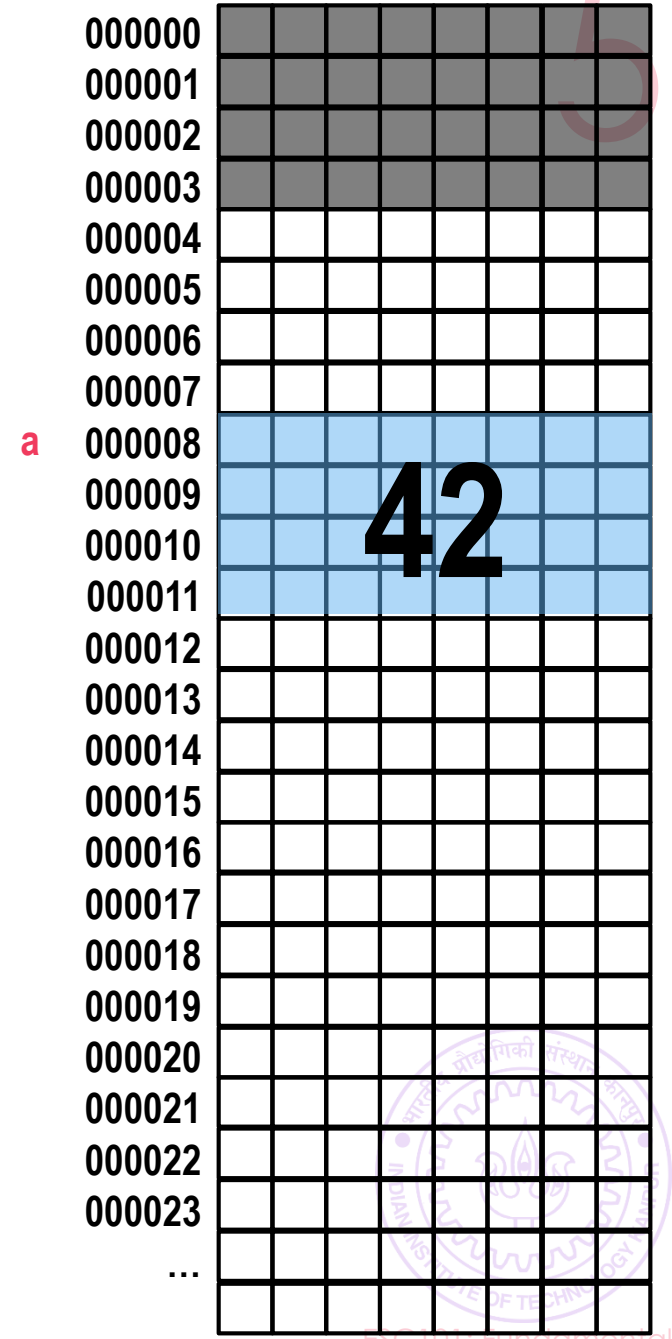

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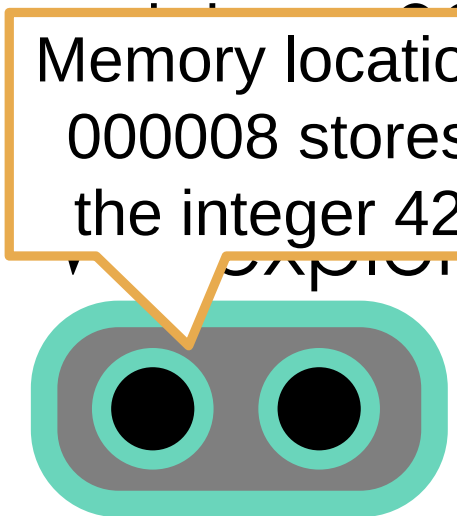

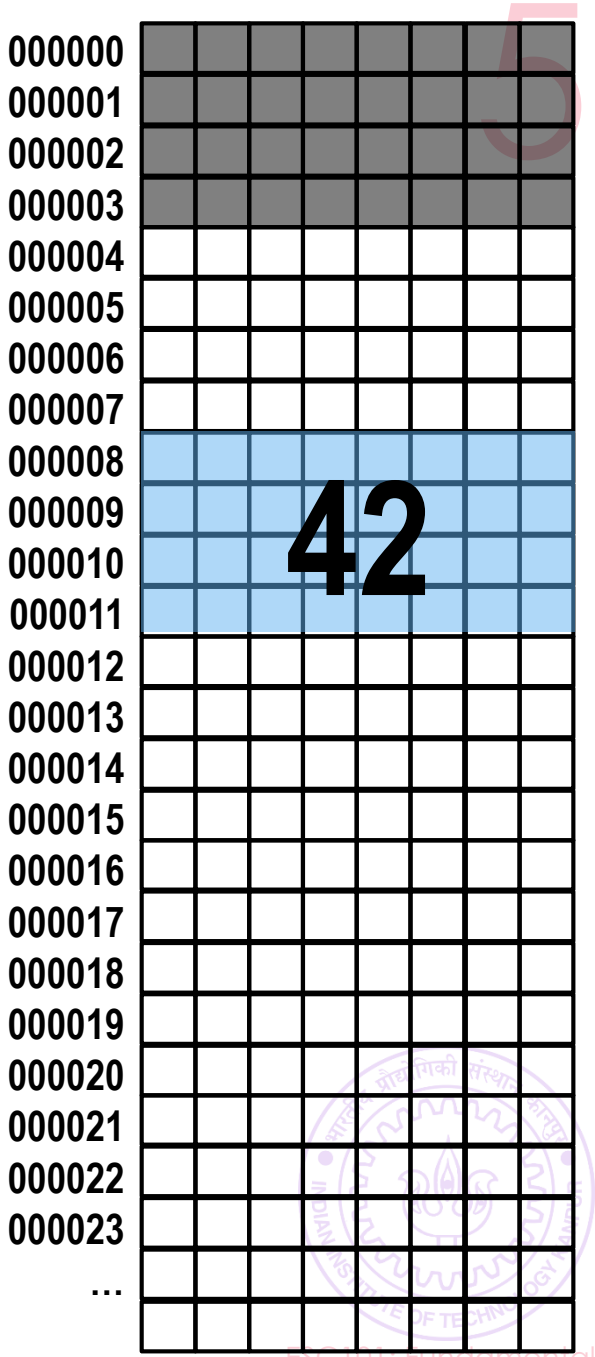

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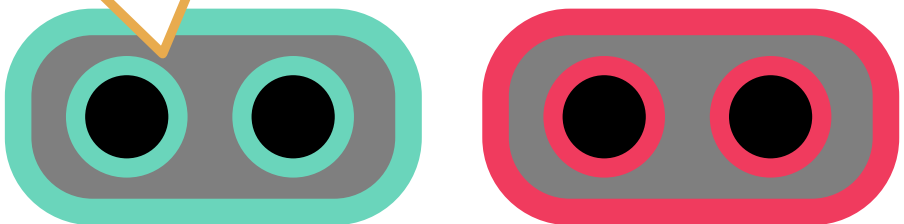

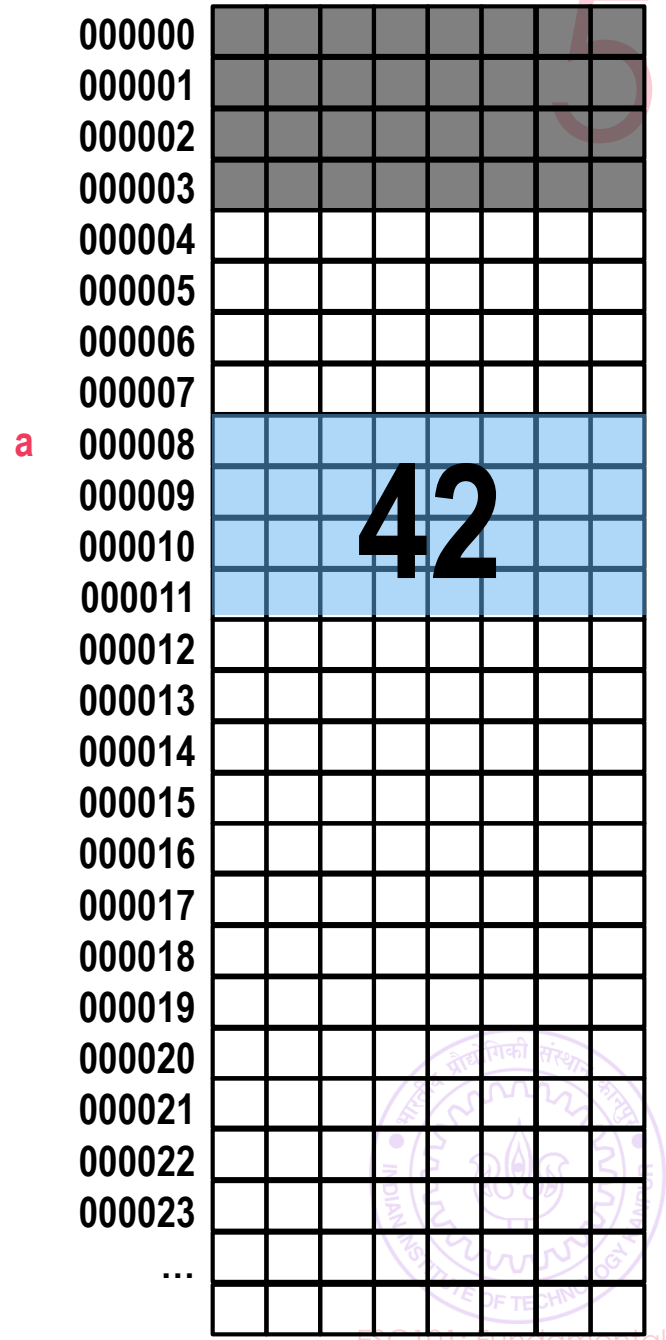

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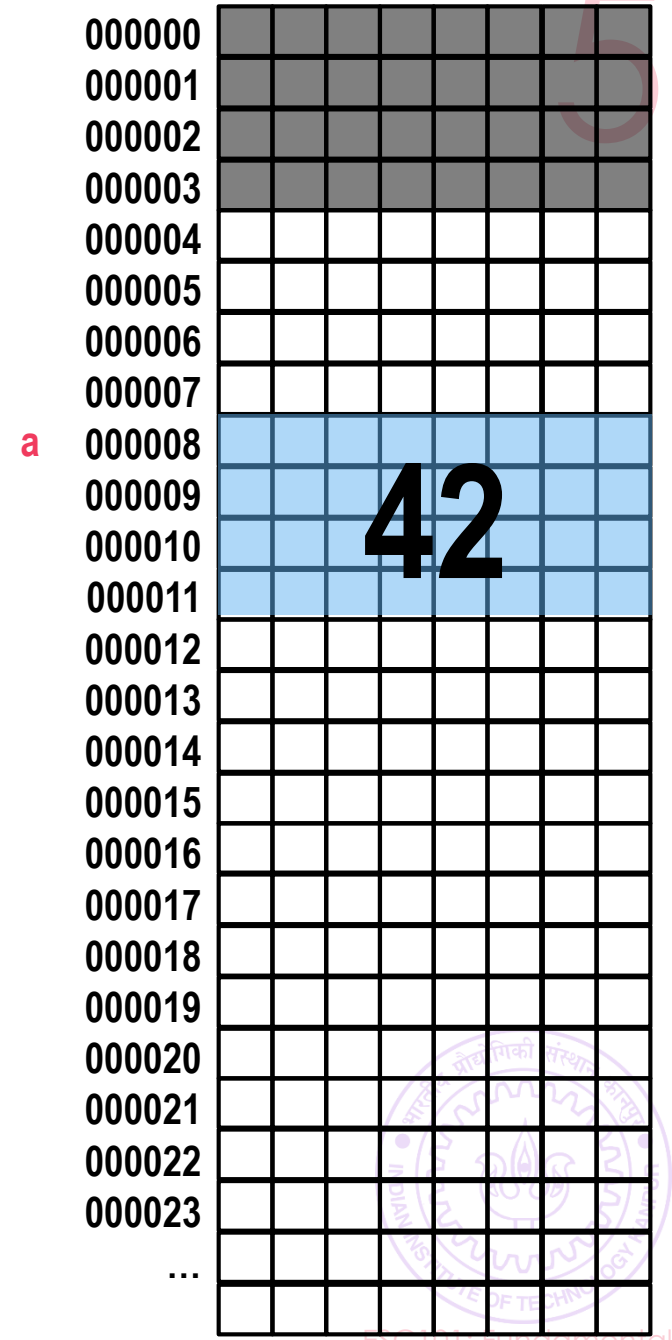

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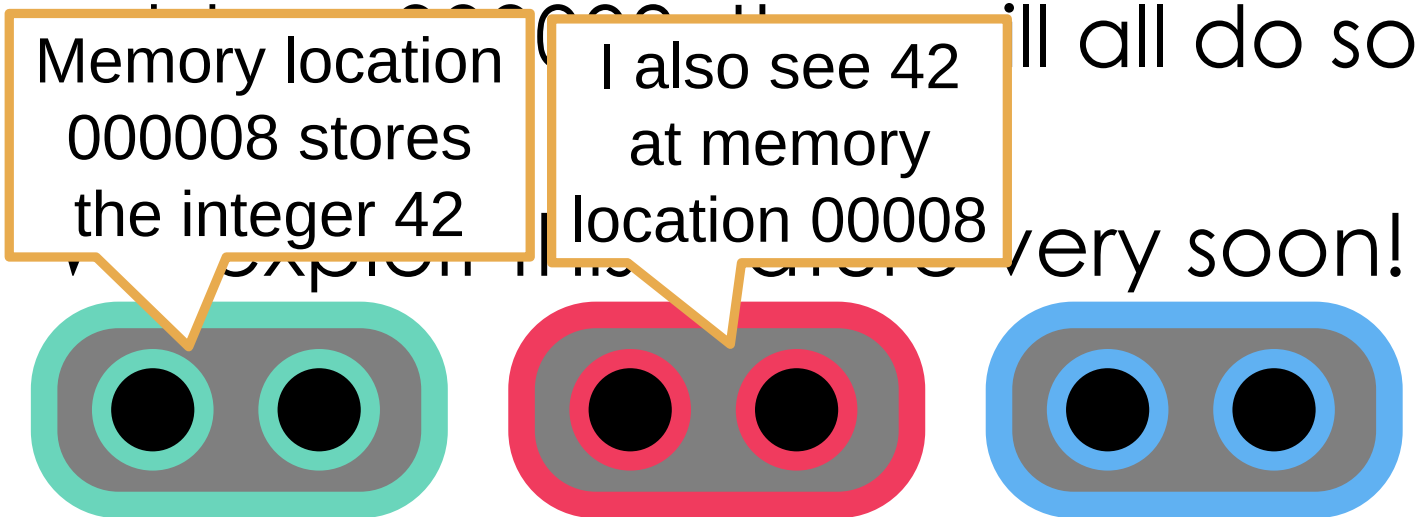

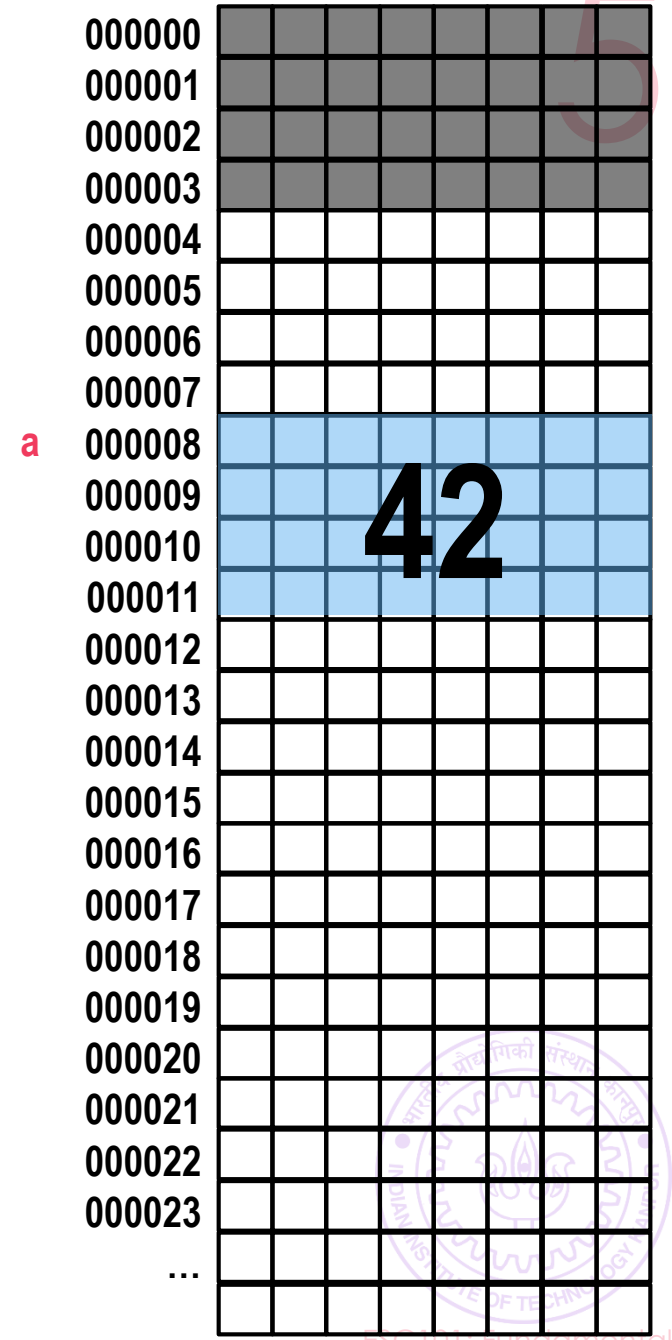

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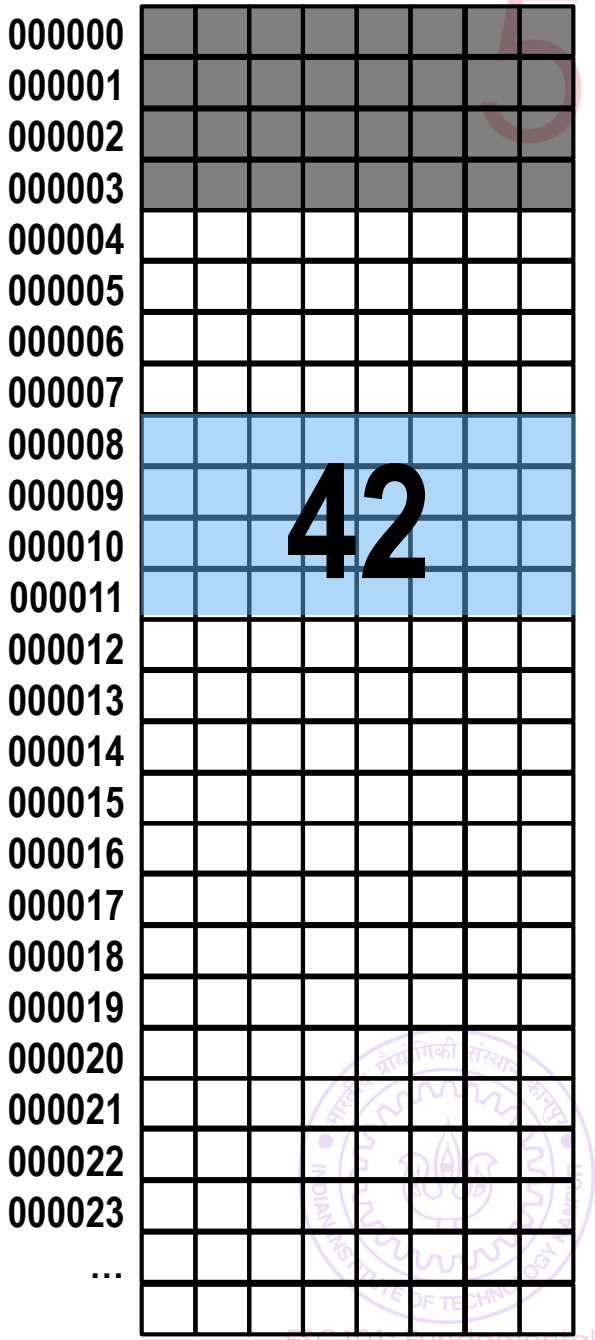

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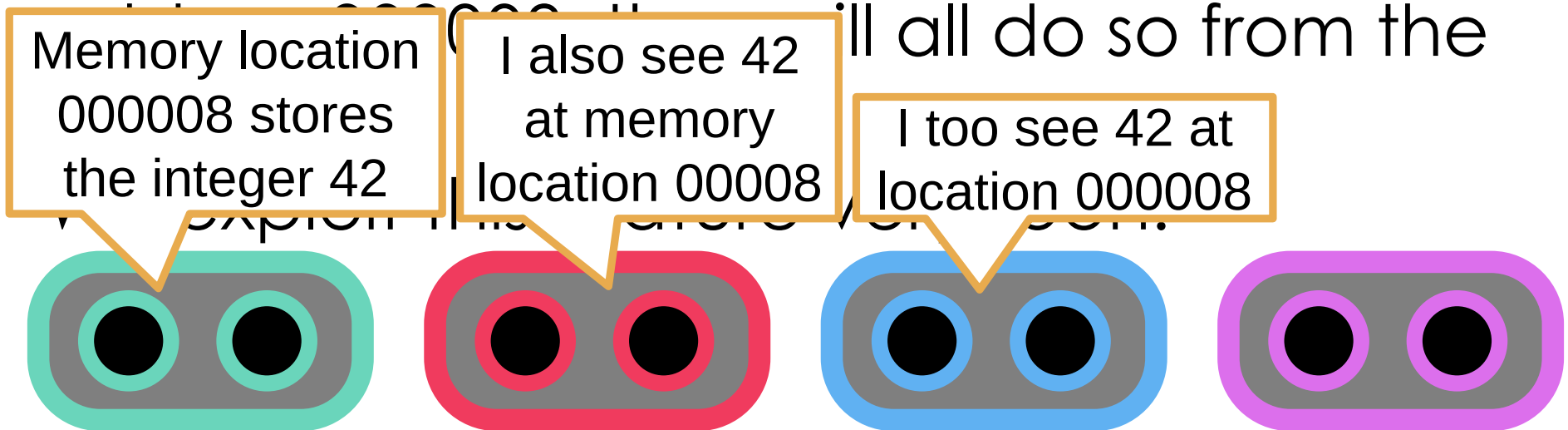

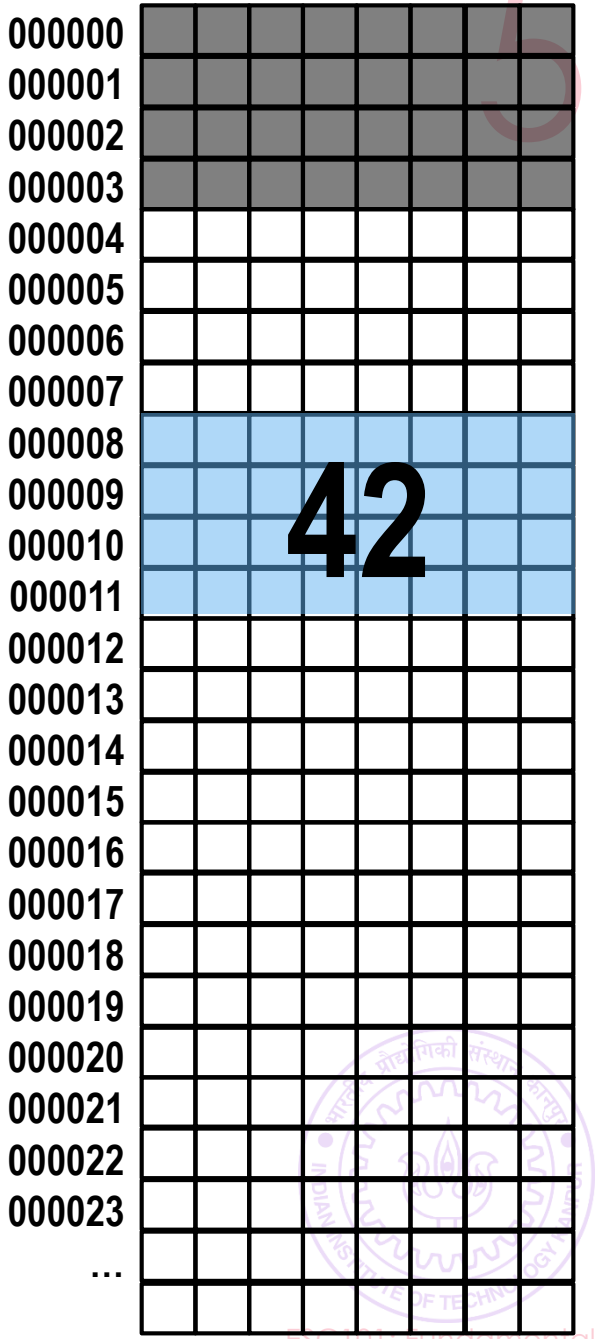

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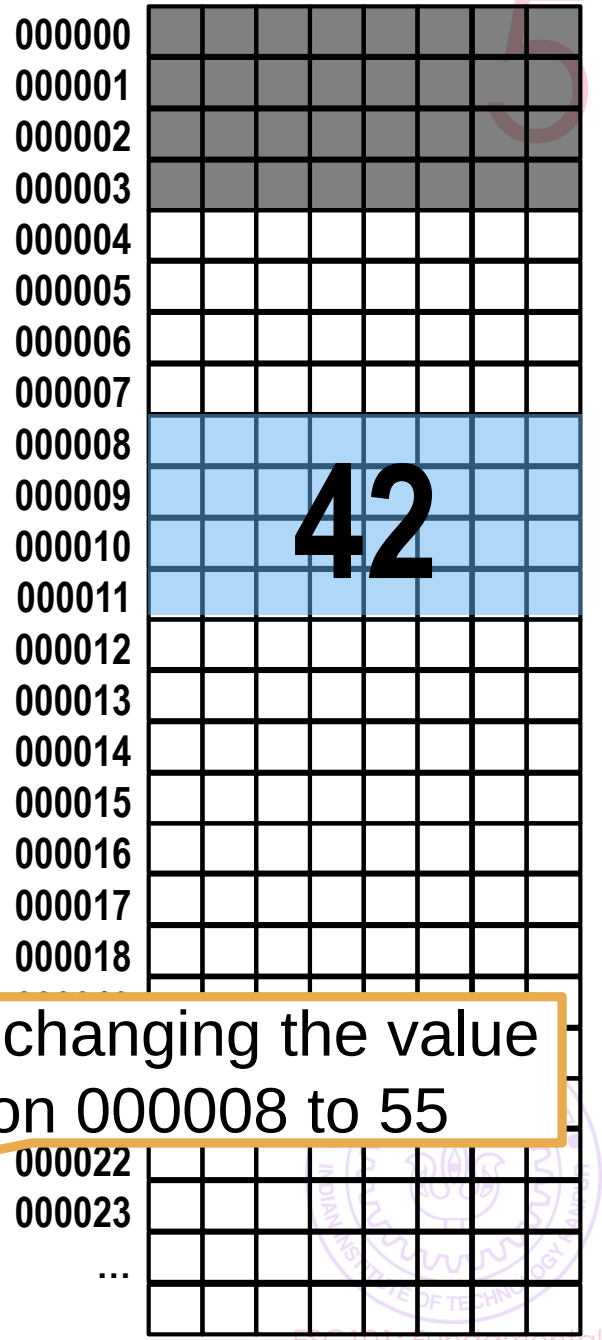

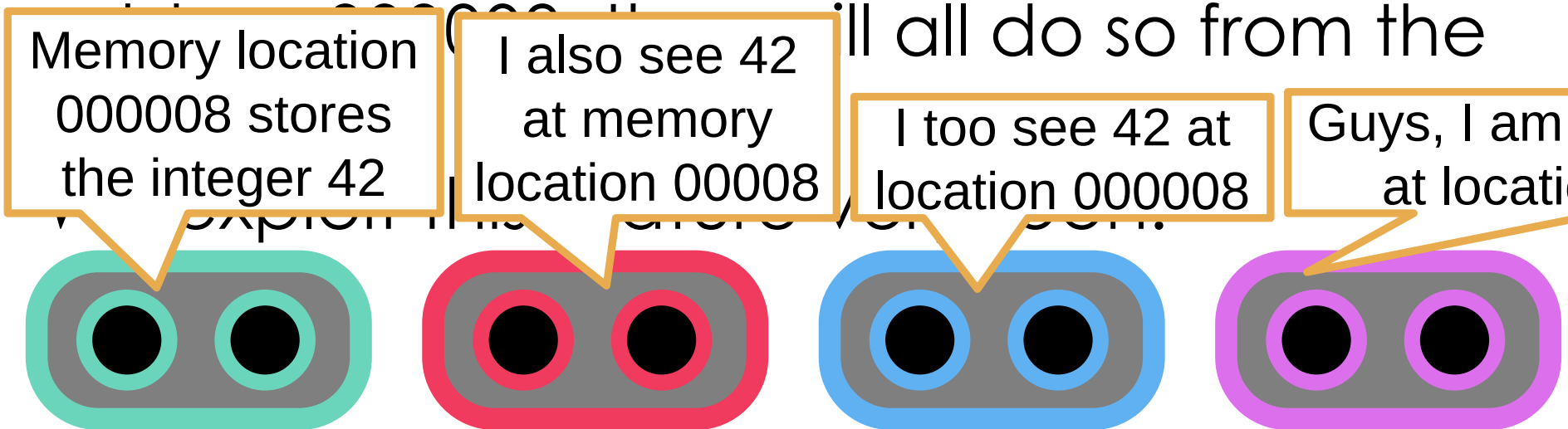

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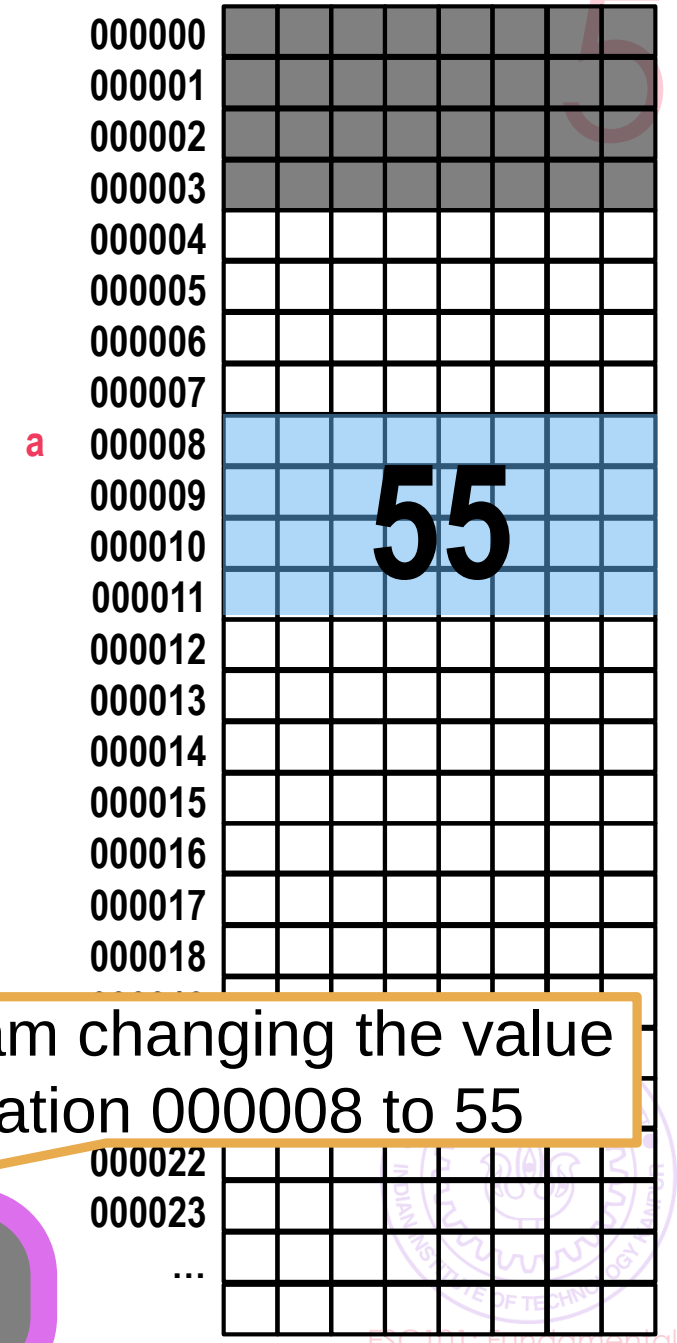

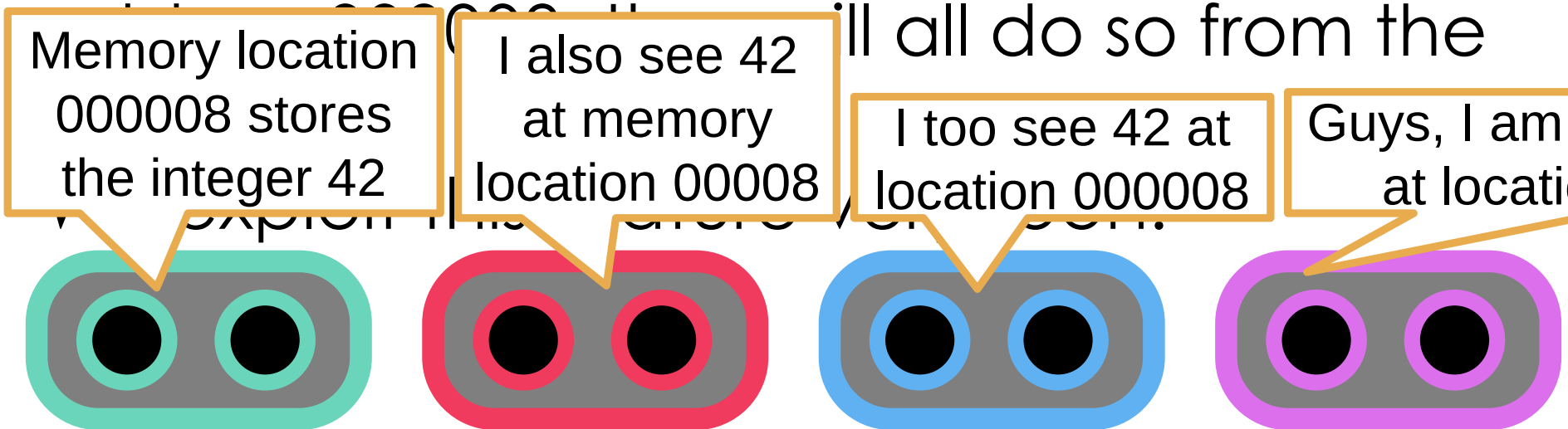

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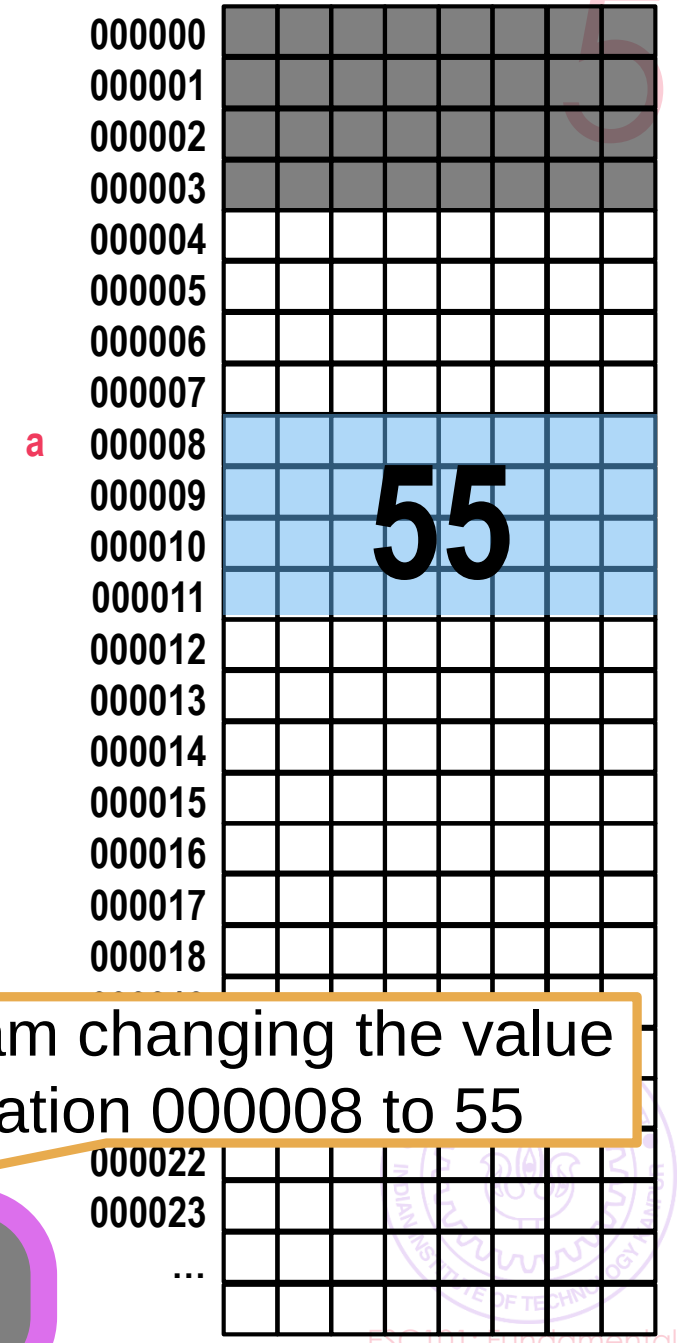

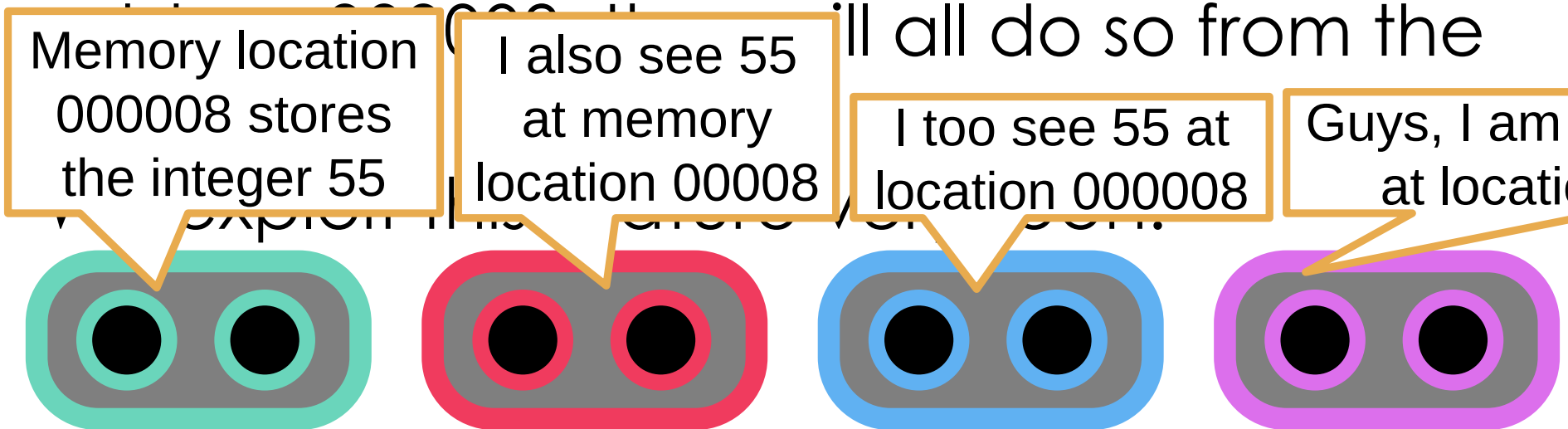

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We will take examples to understand each of them

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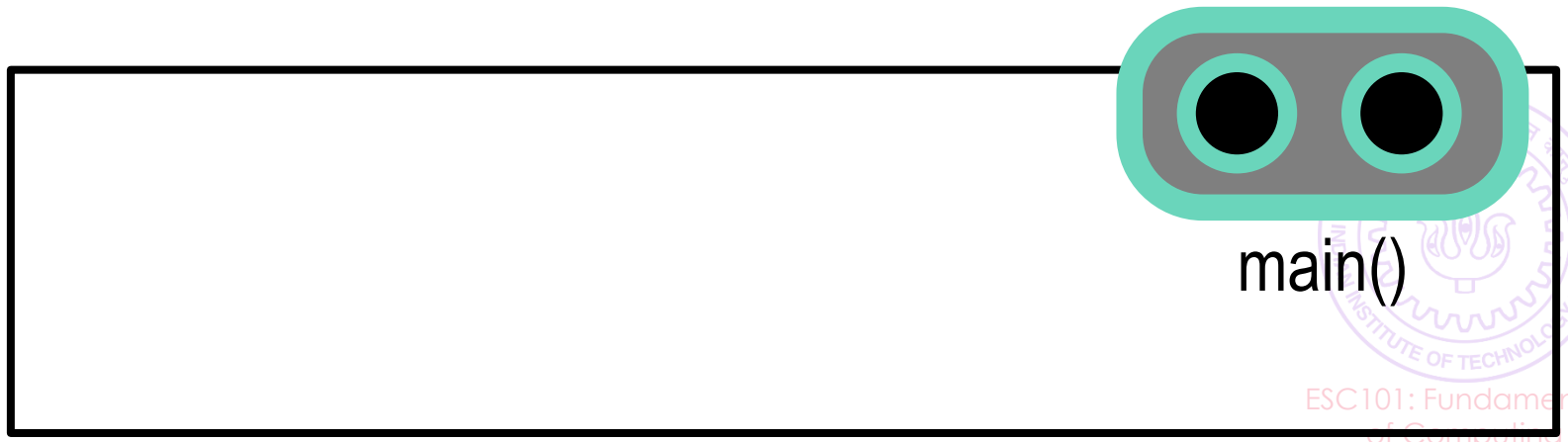

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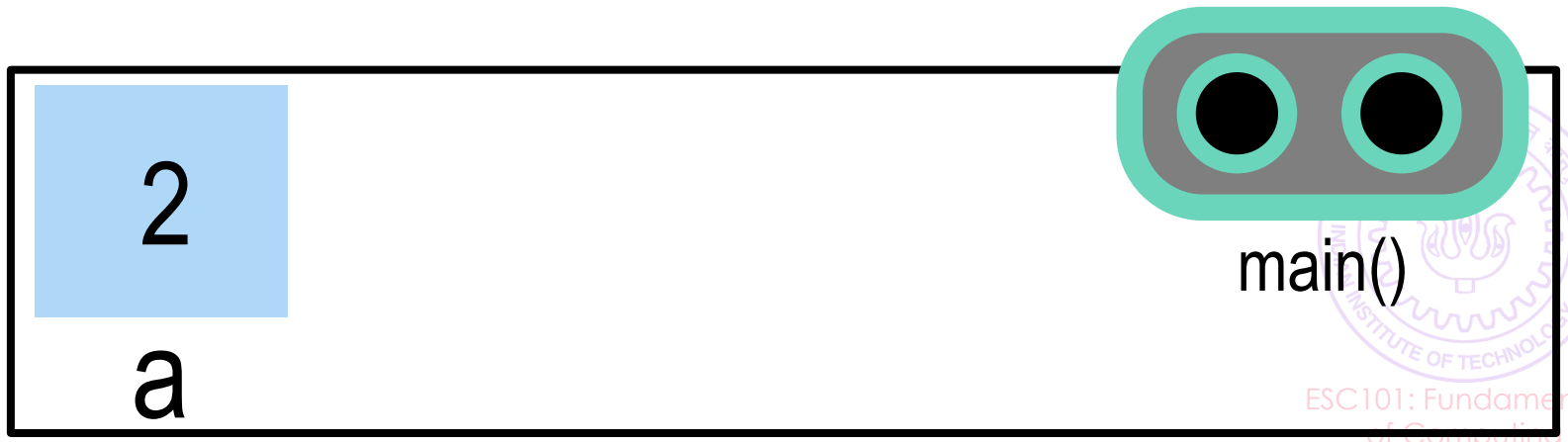

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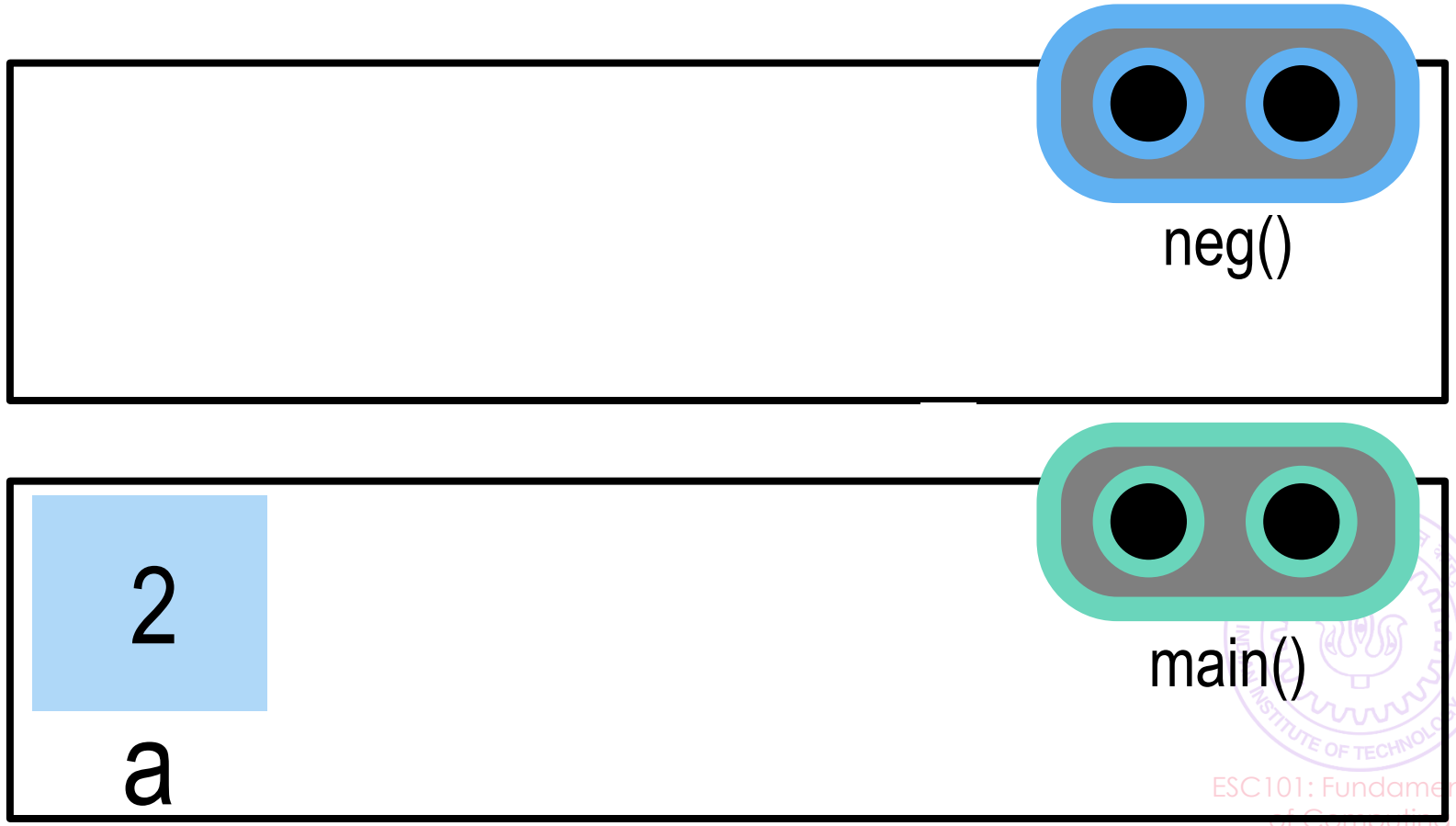

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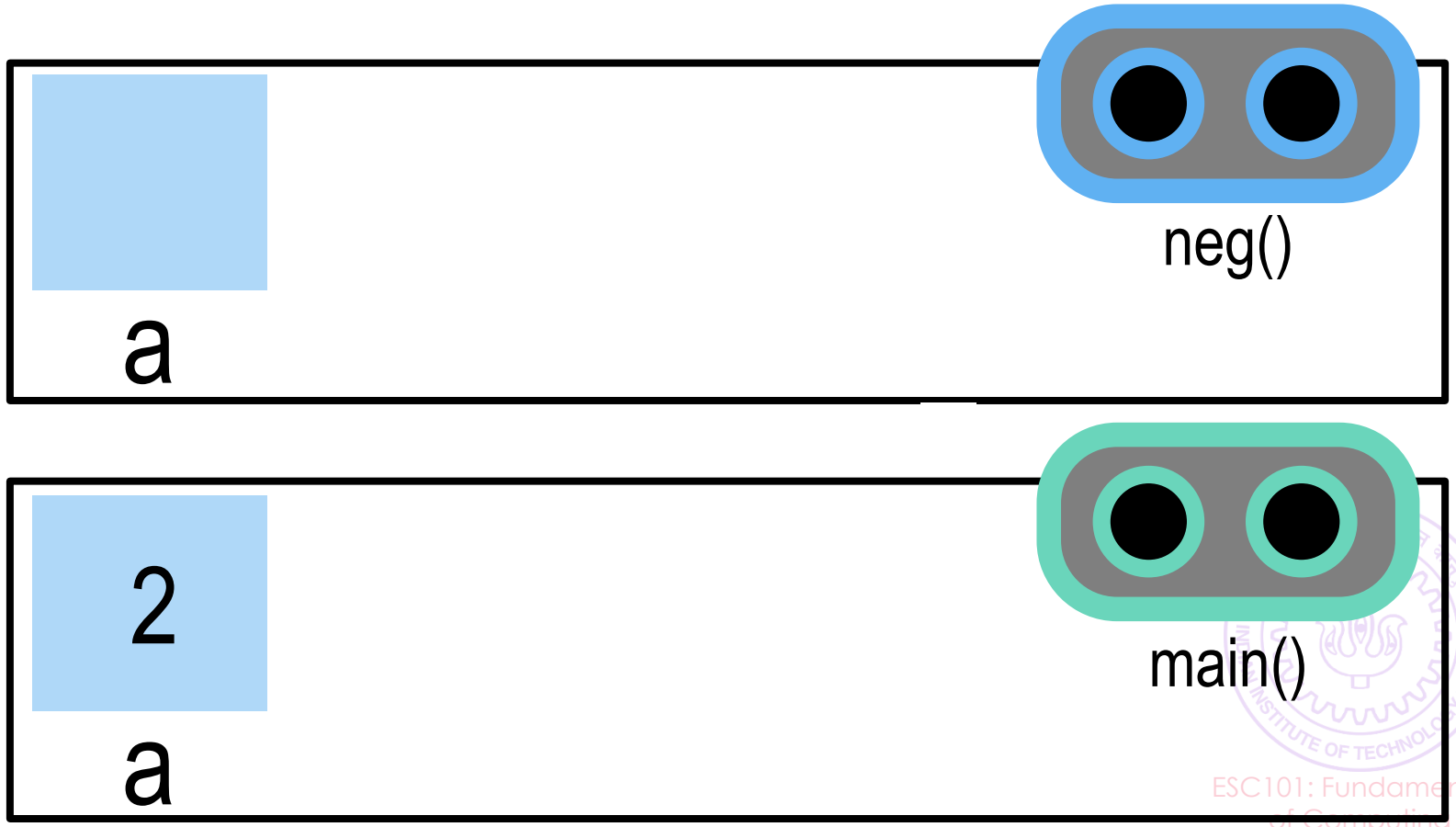

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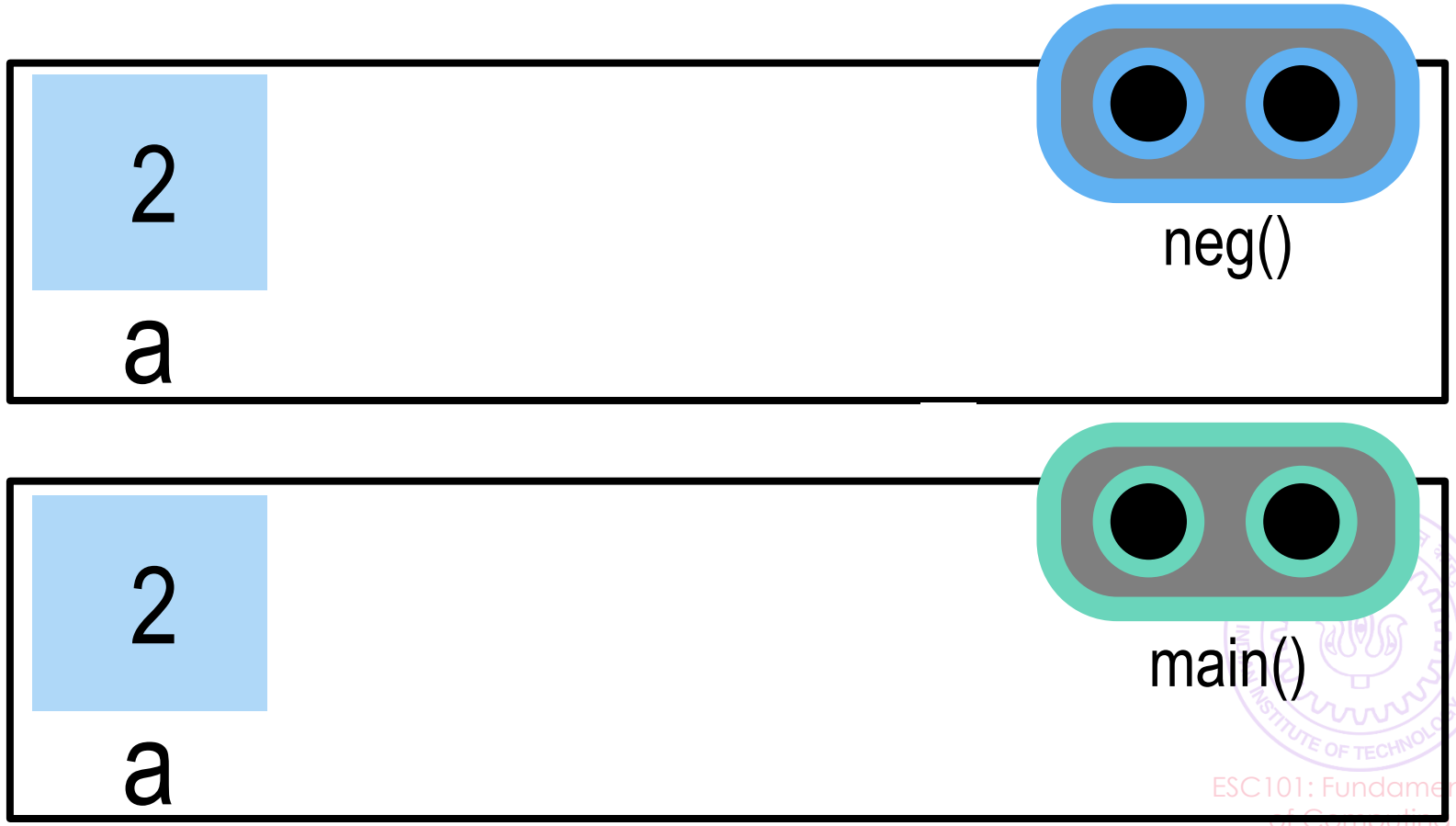

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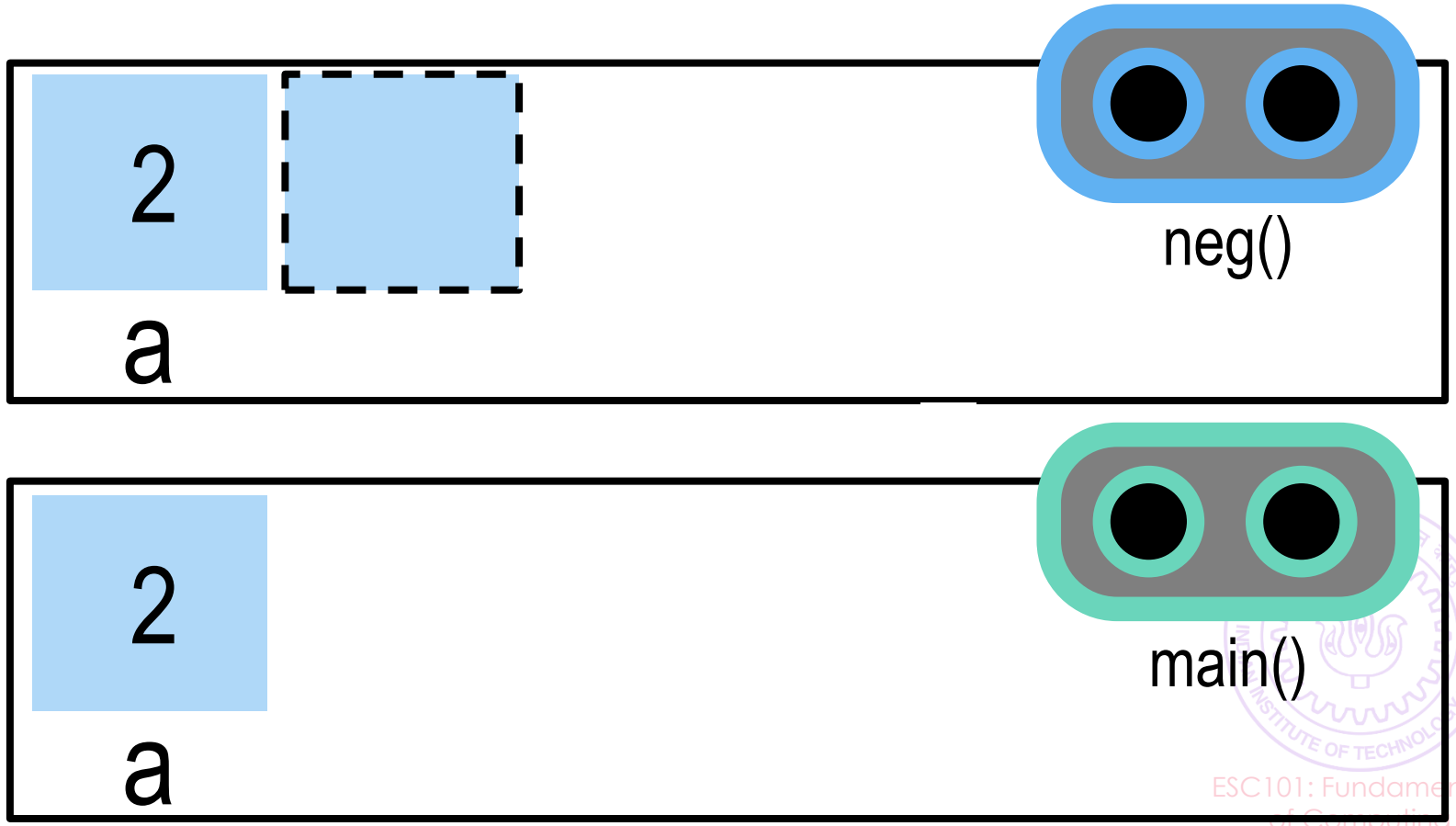

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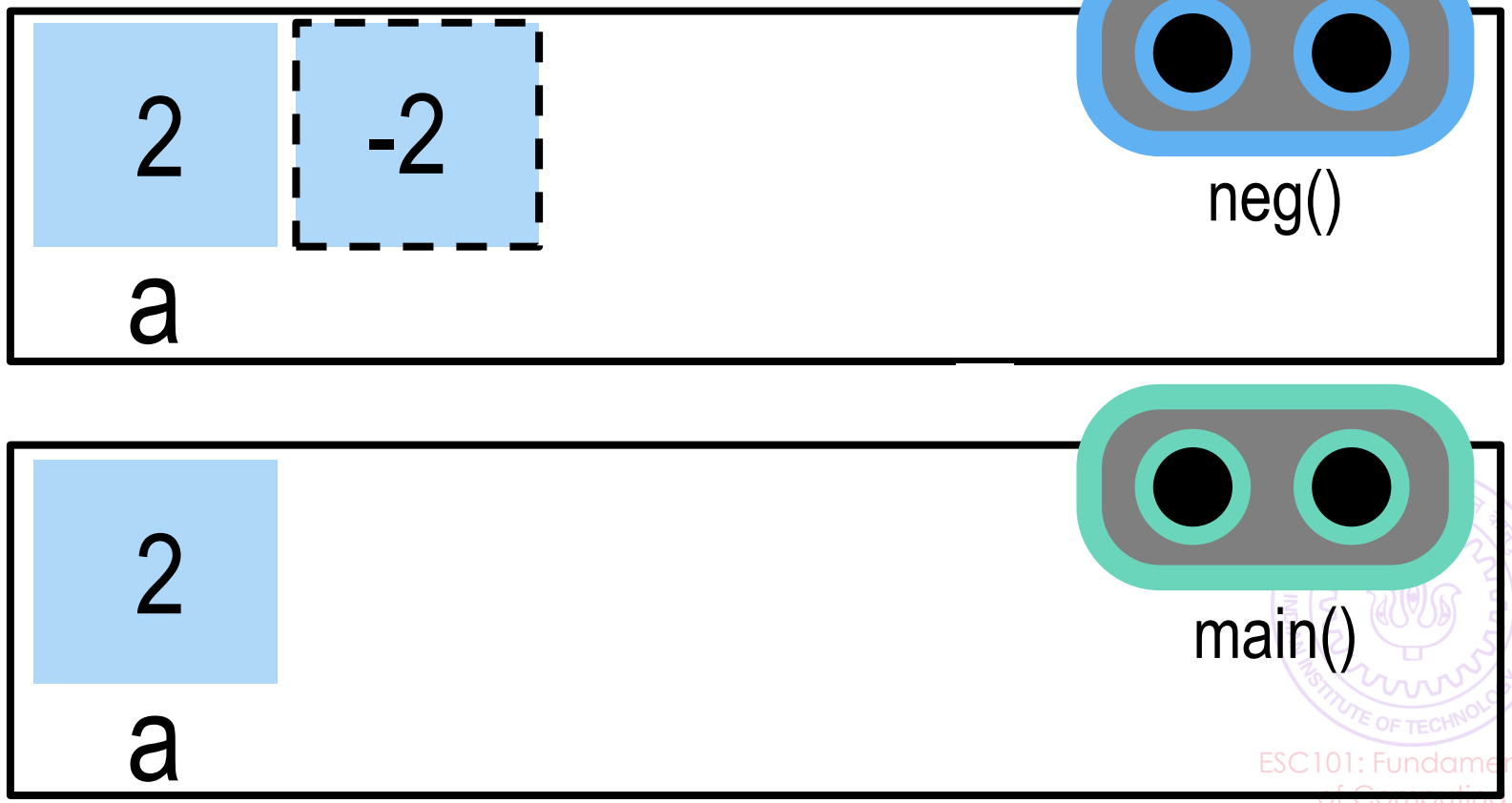

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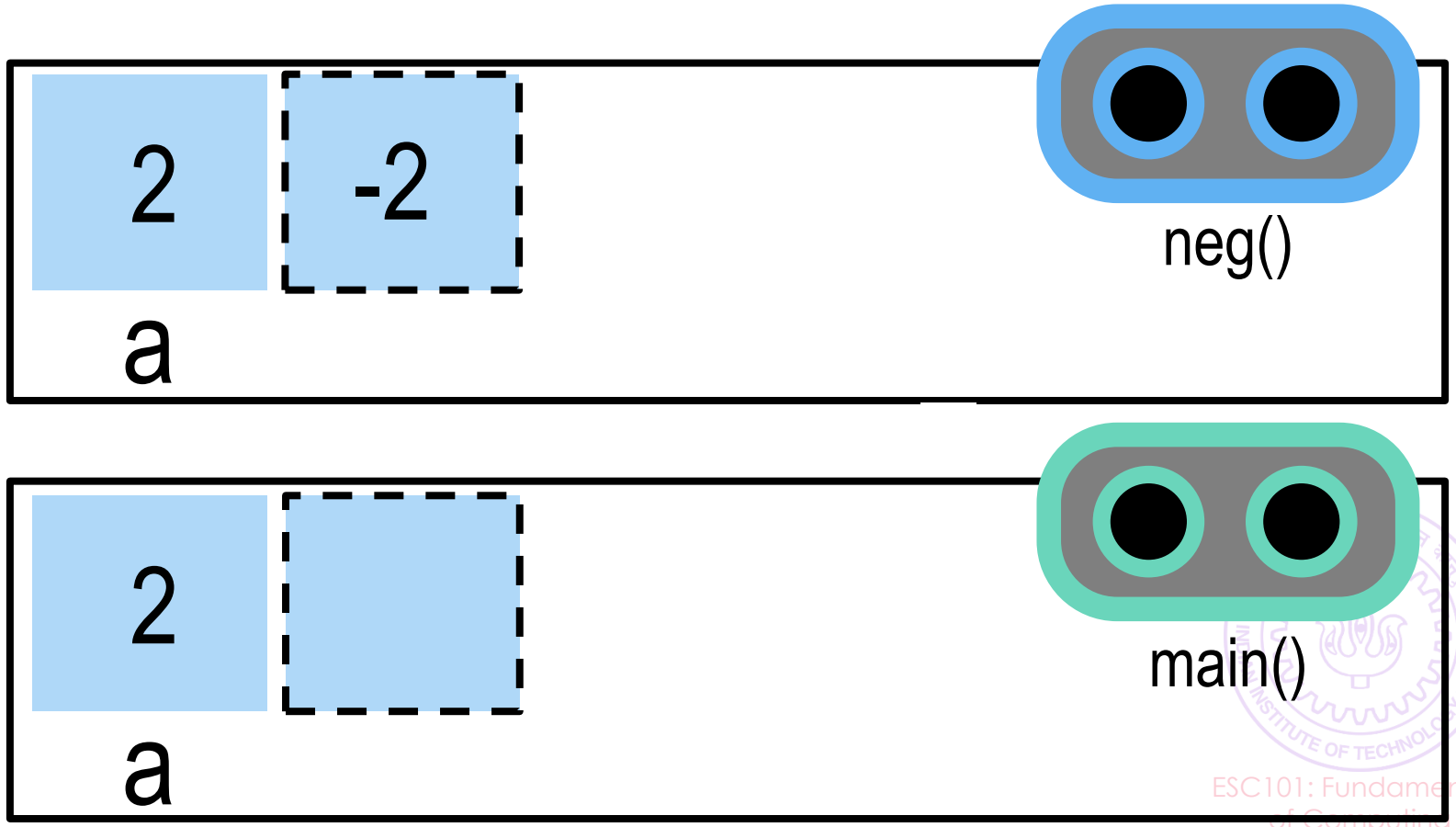

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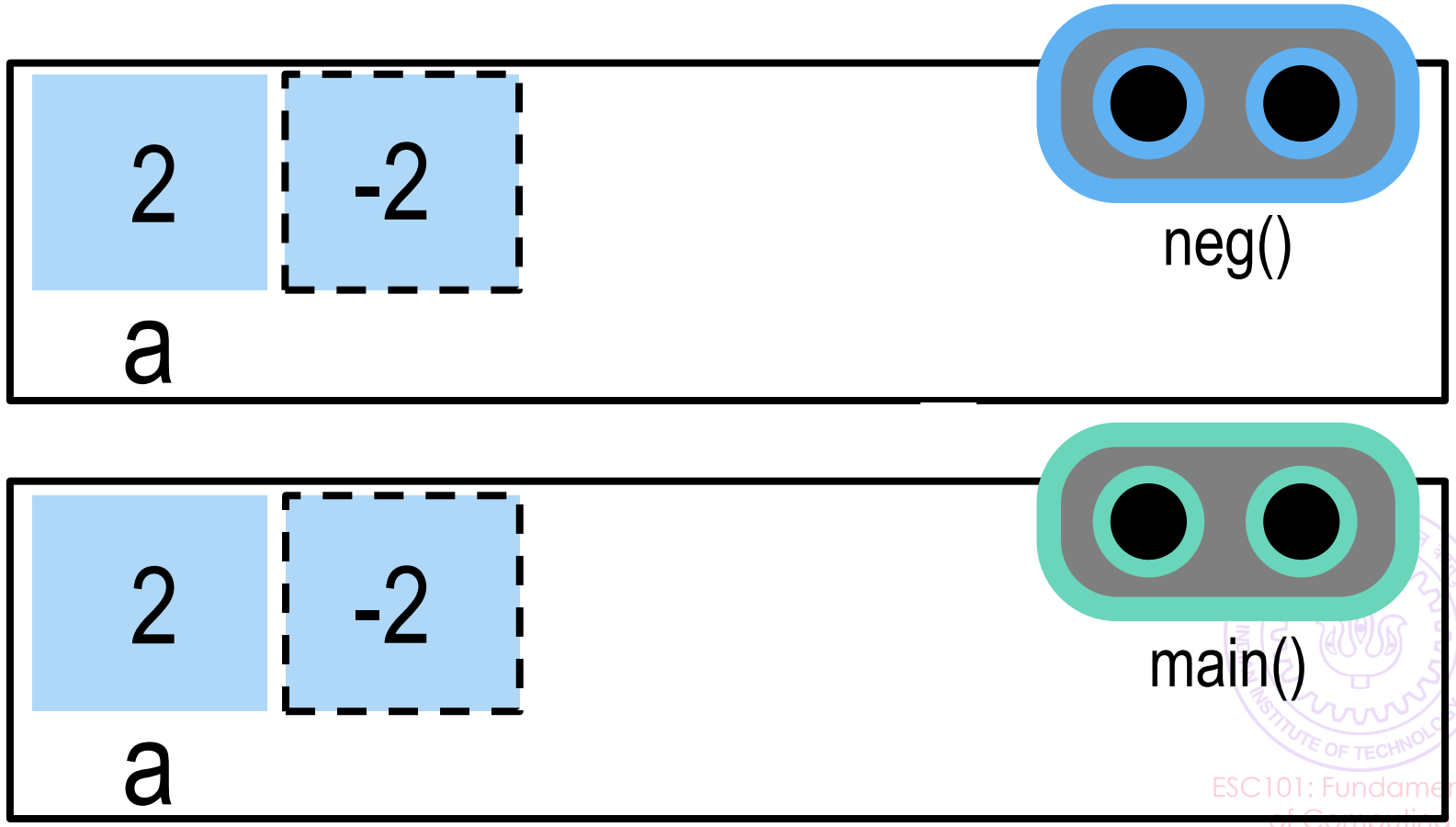

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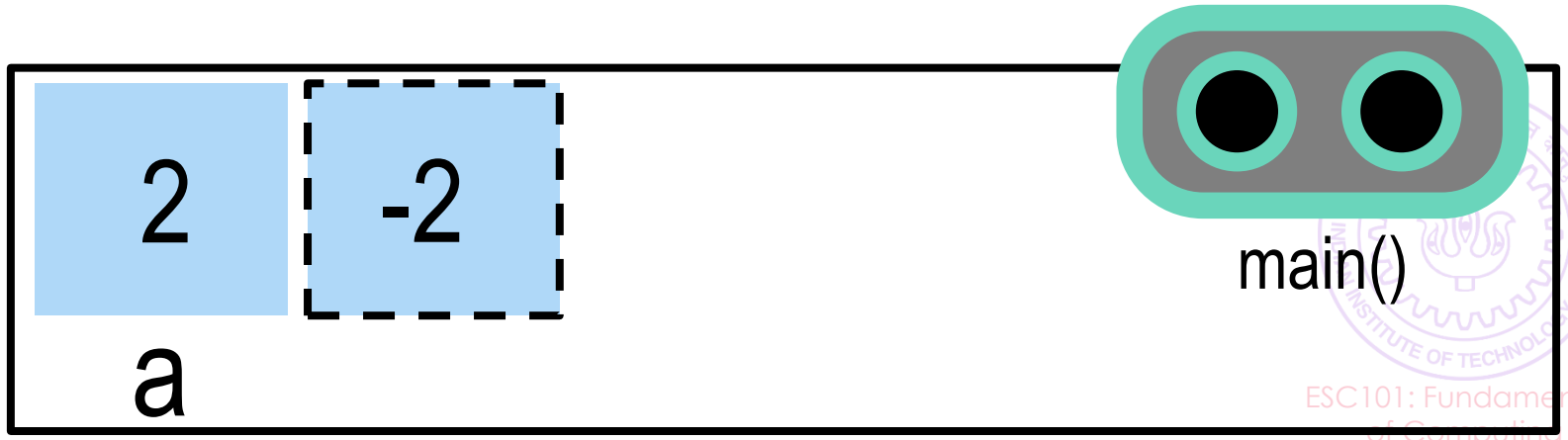

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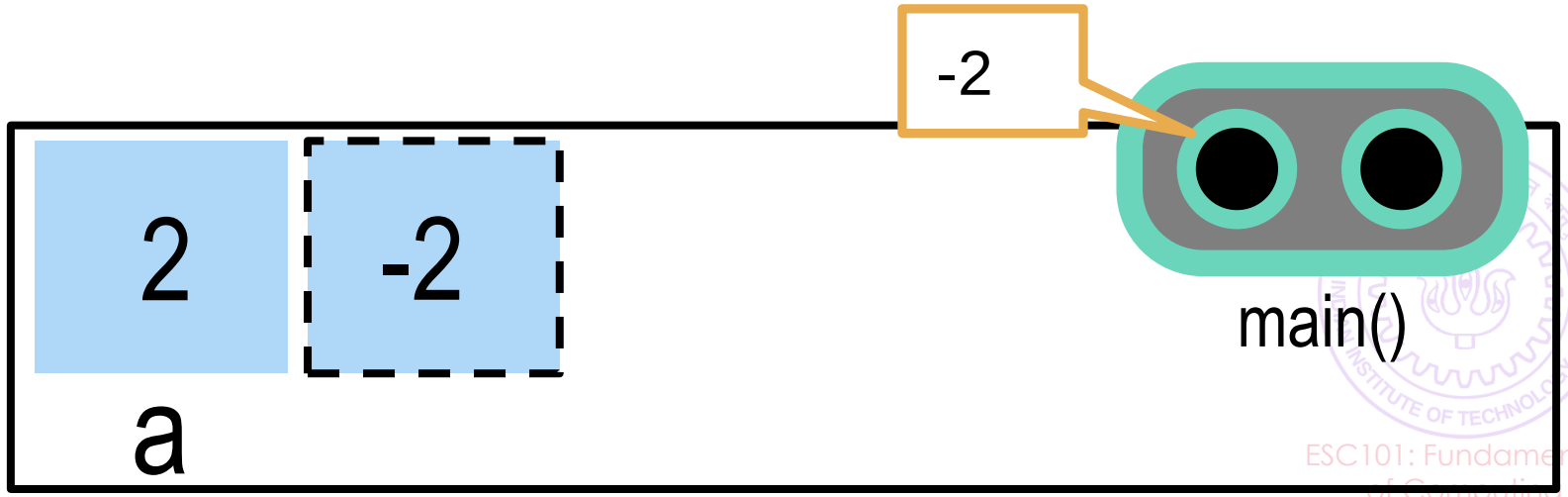

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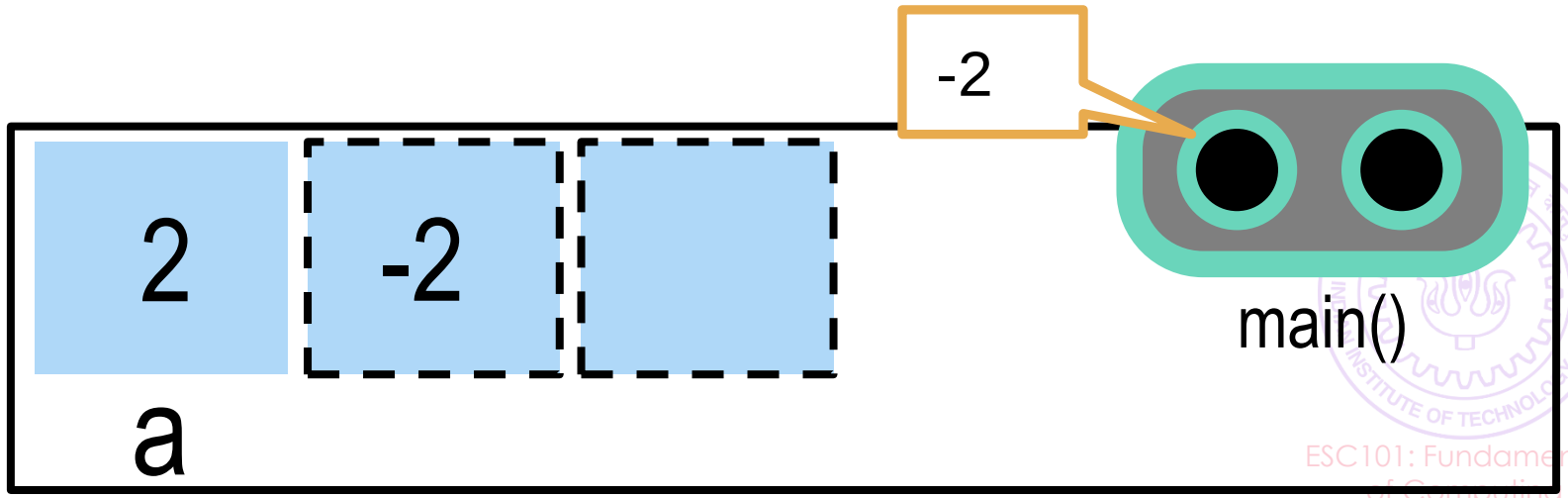

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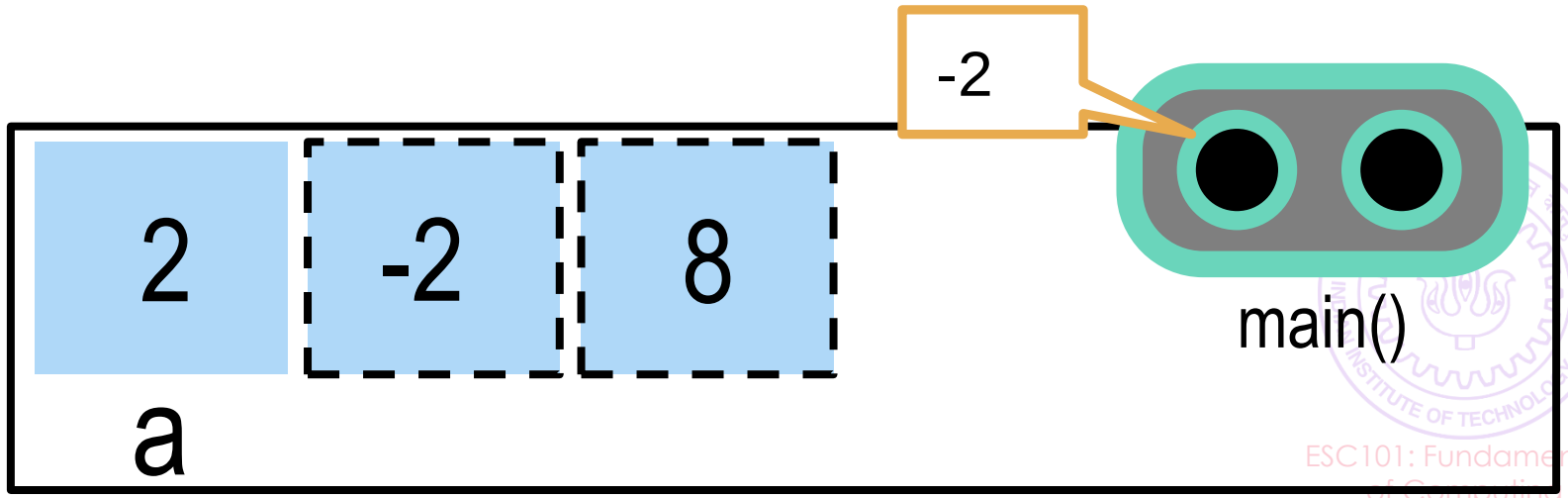

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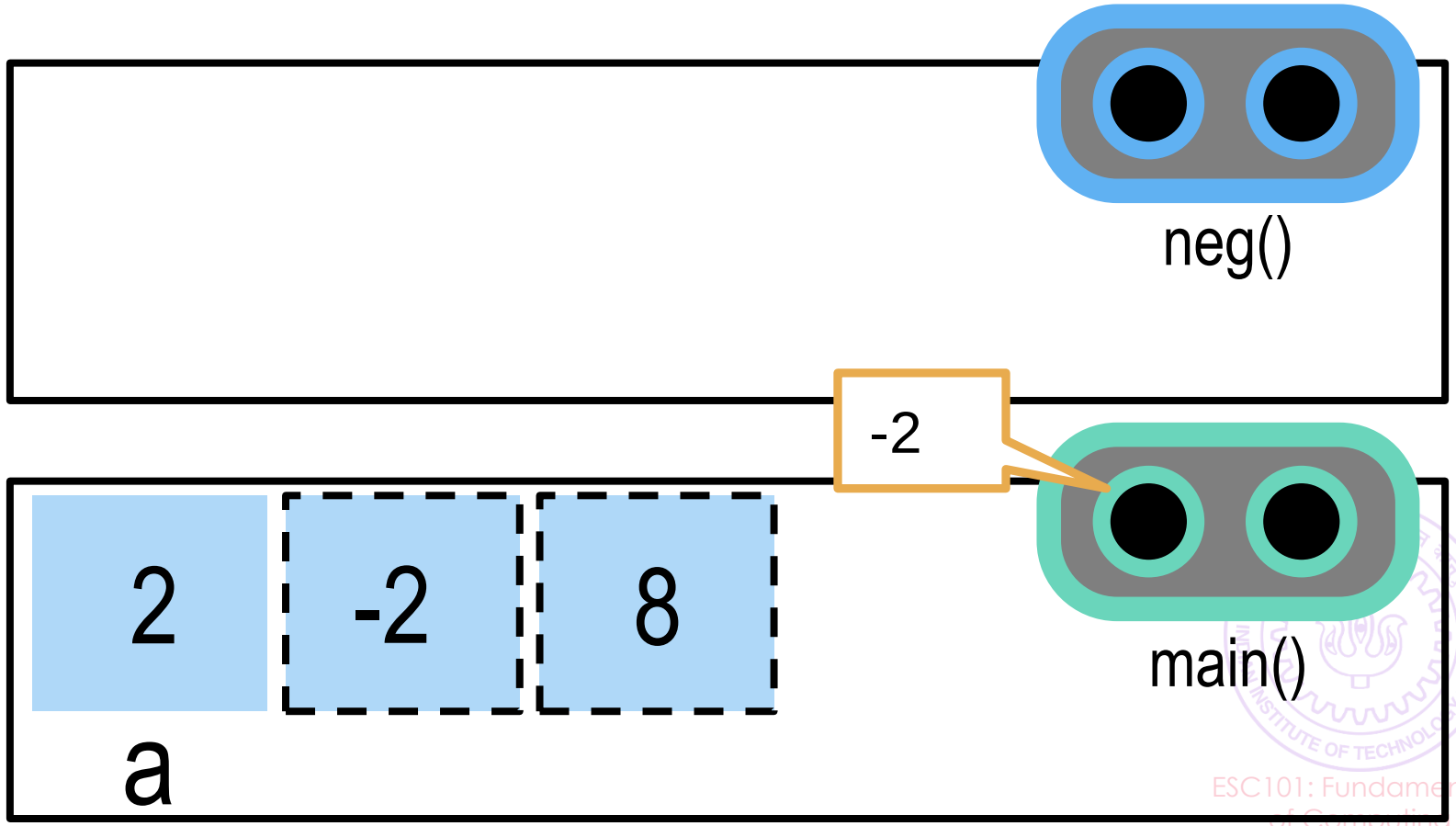

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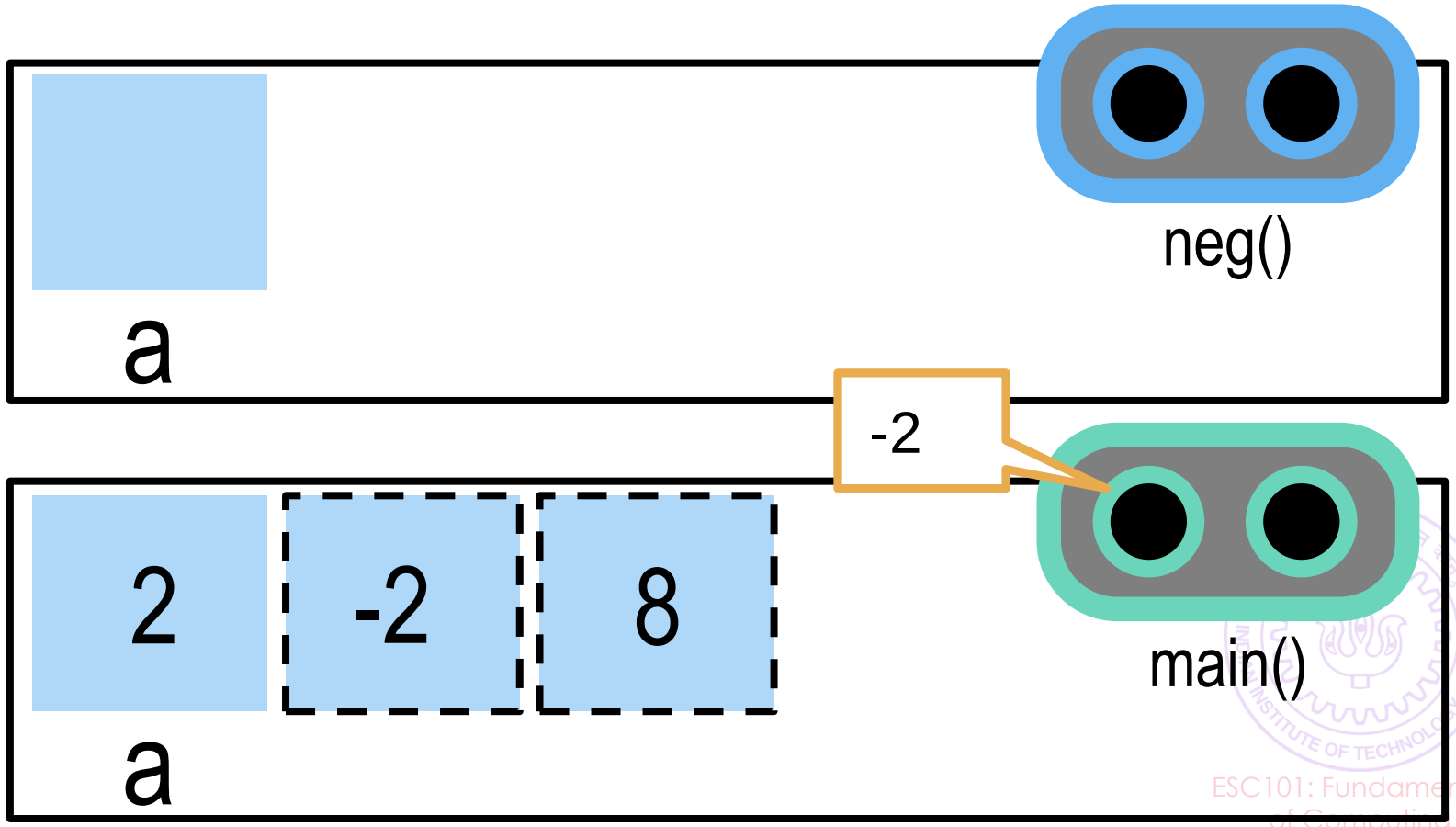

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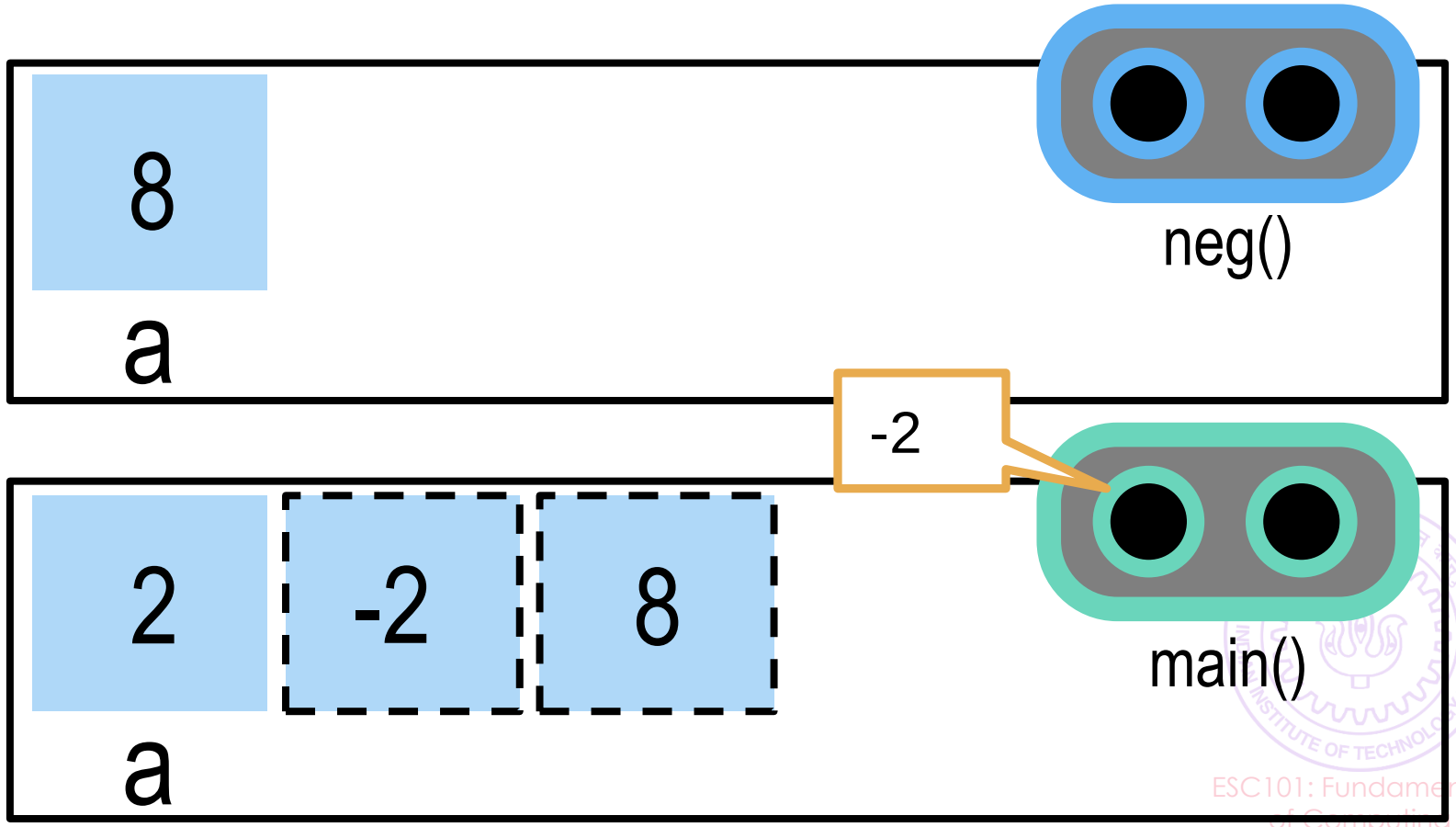

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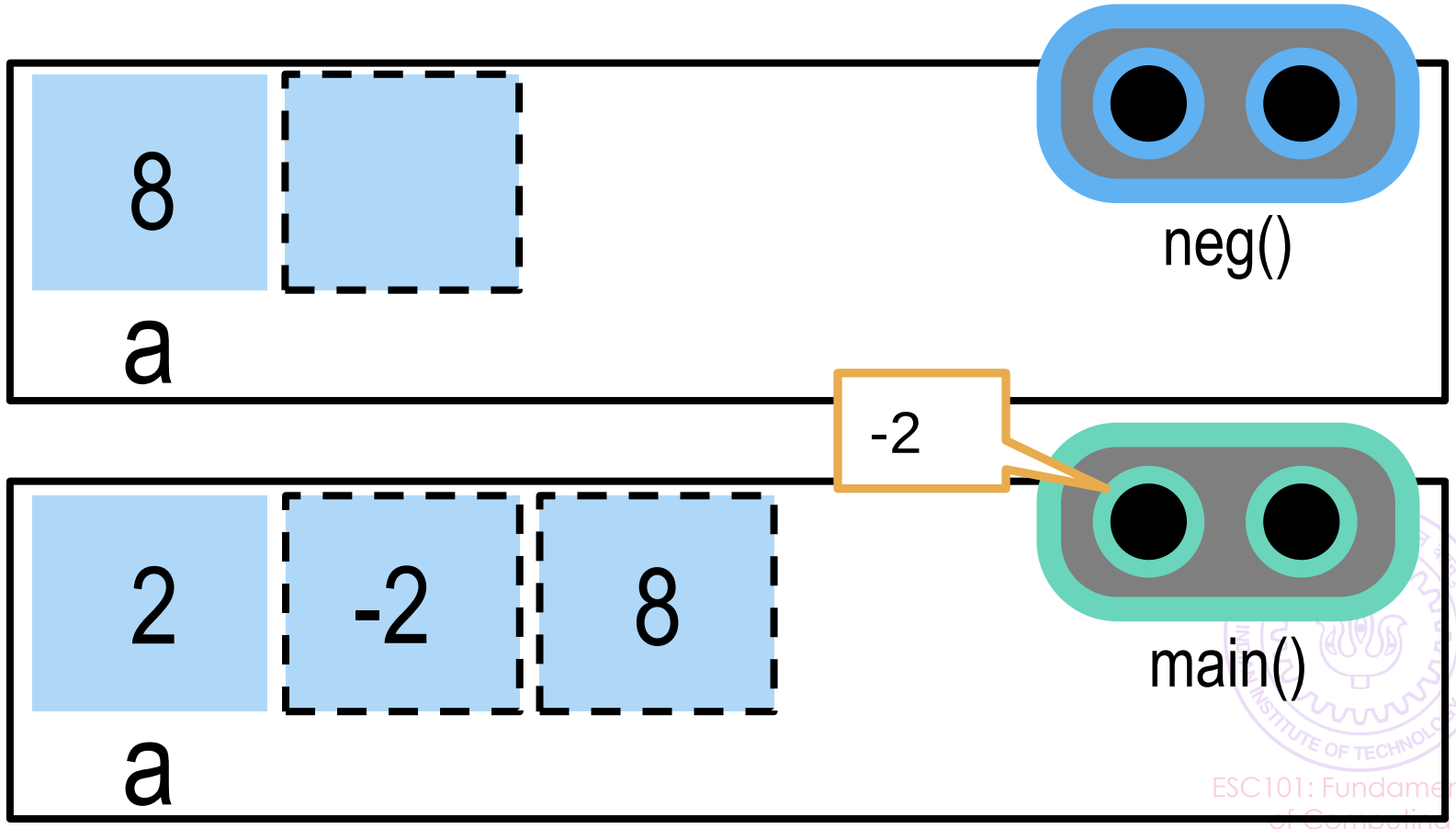

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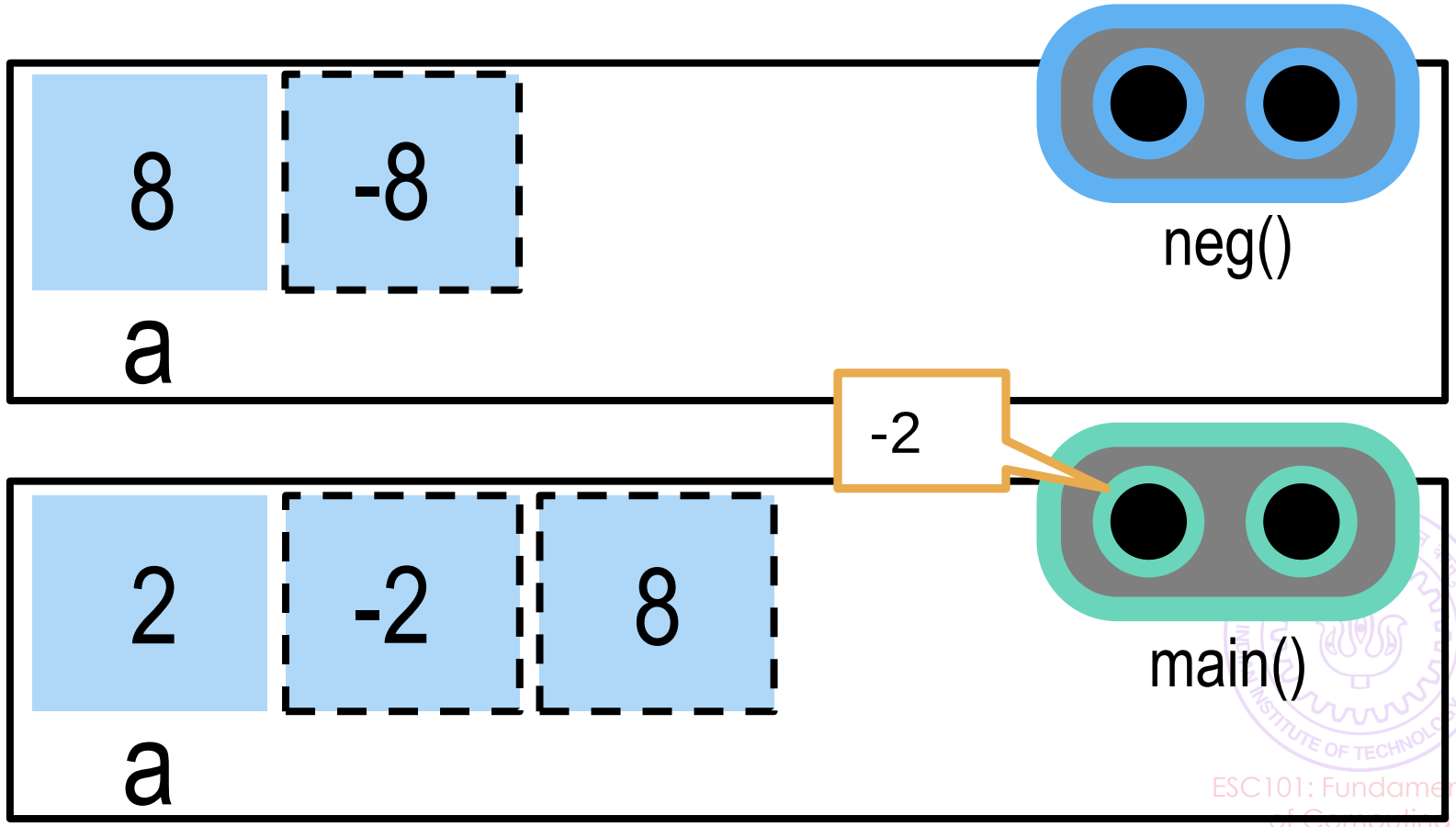

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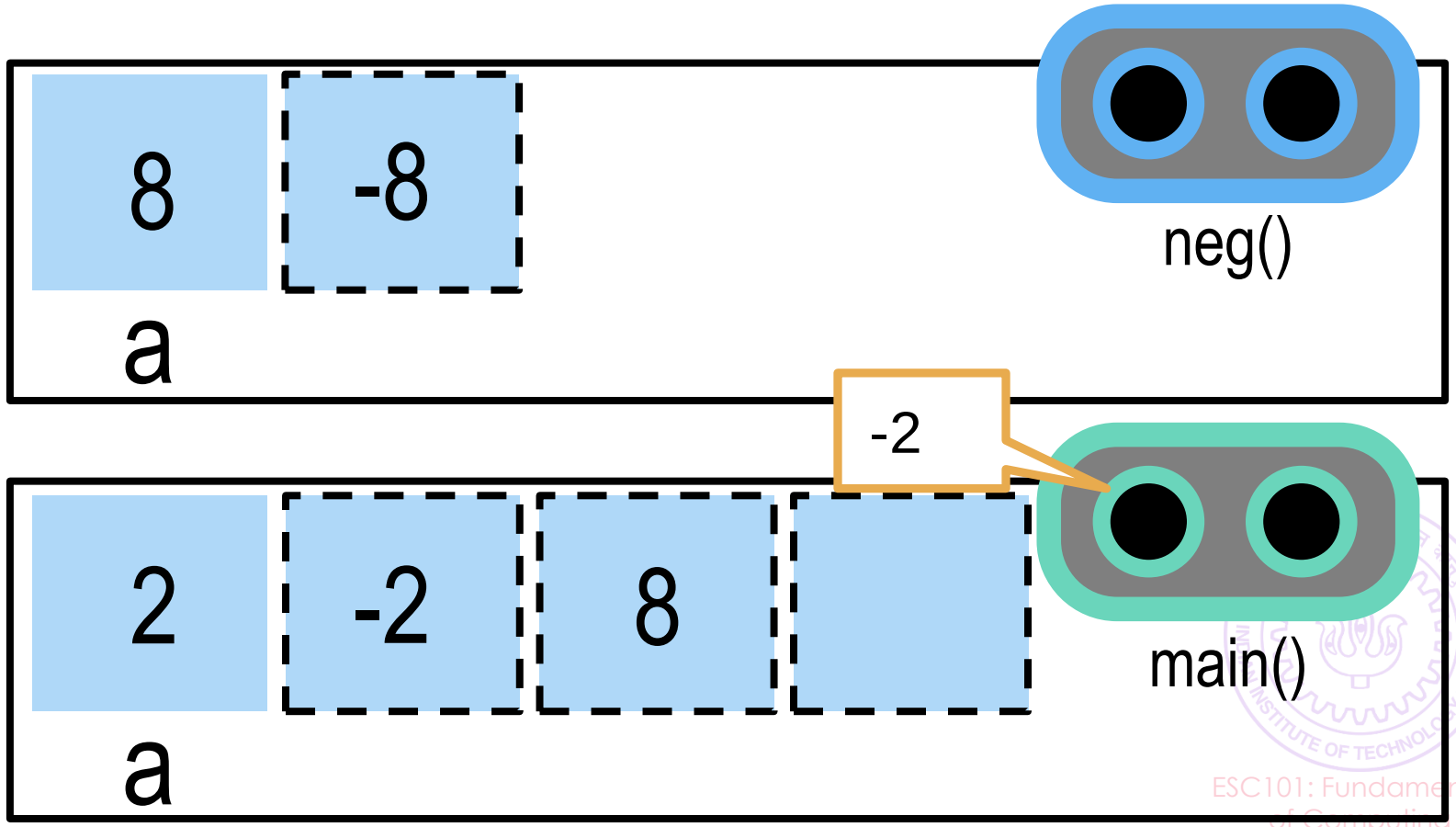

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    printf("%d", neg(4*2);
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}
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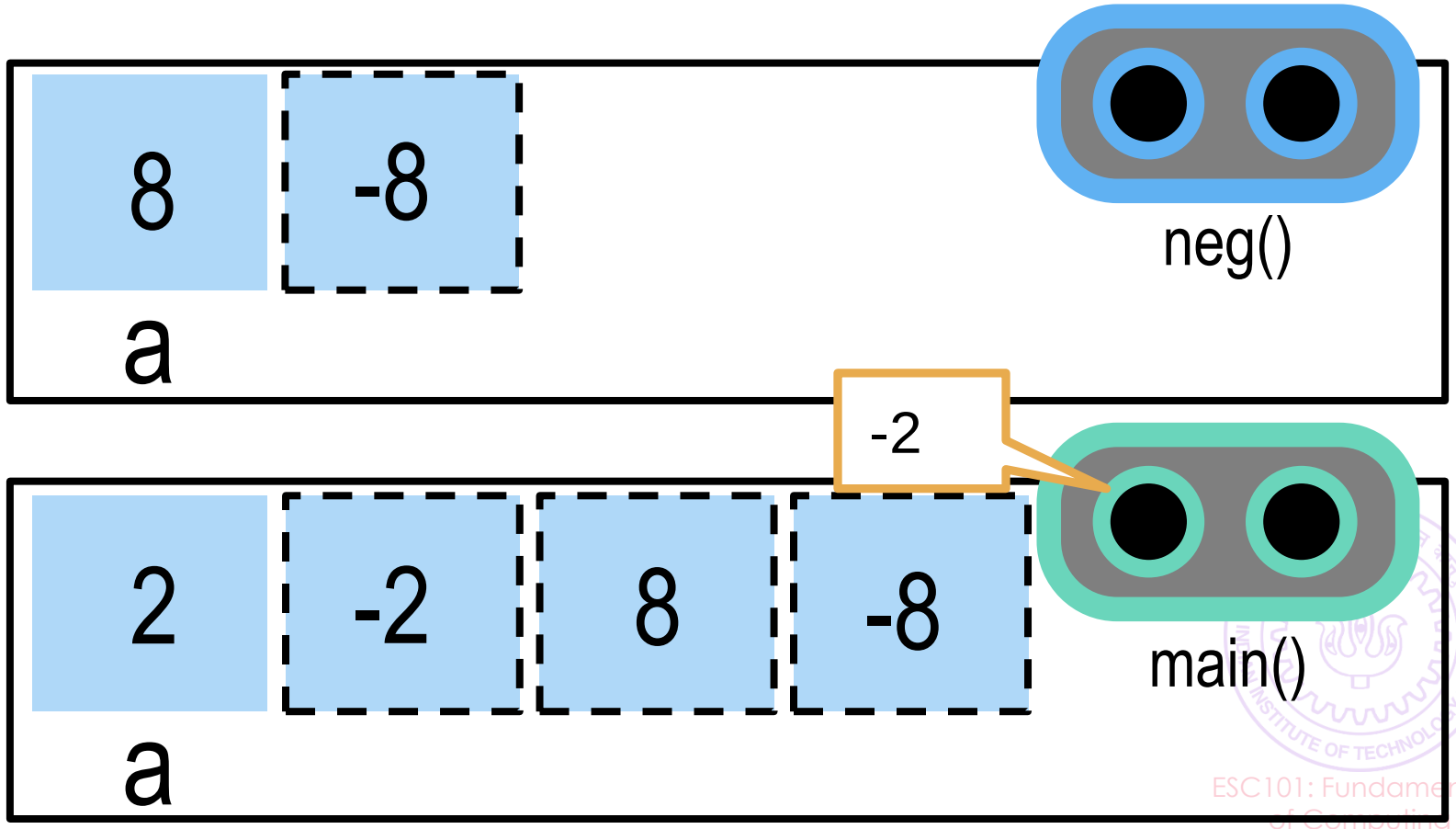

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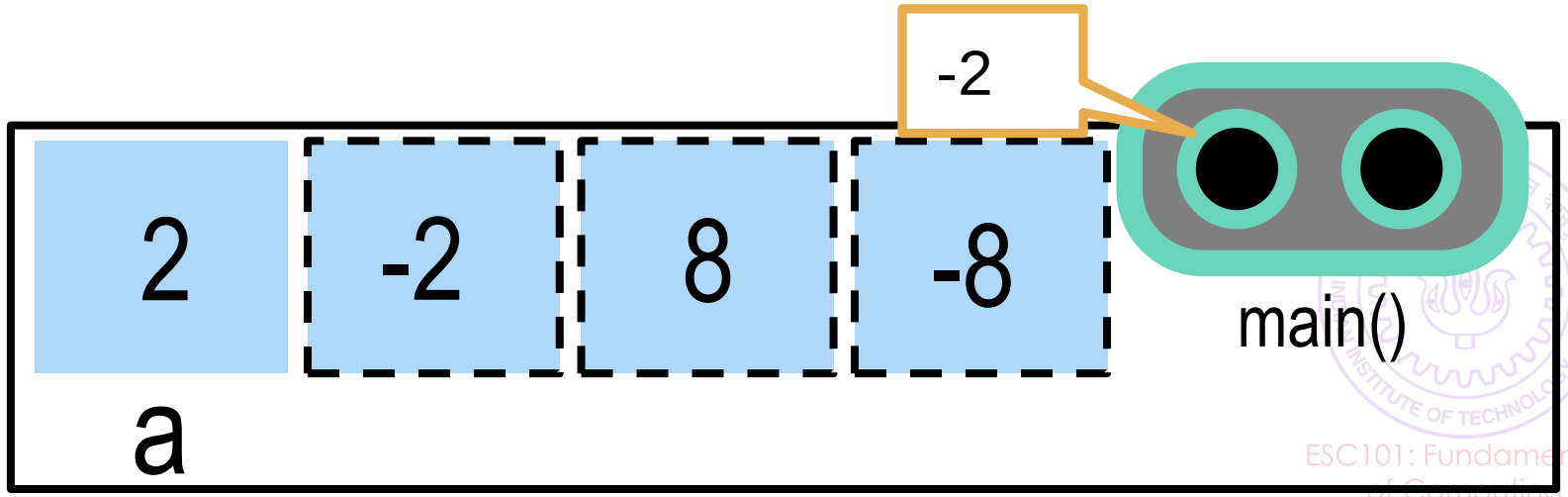

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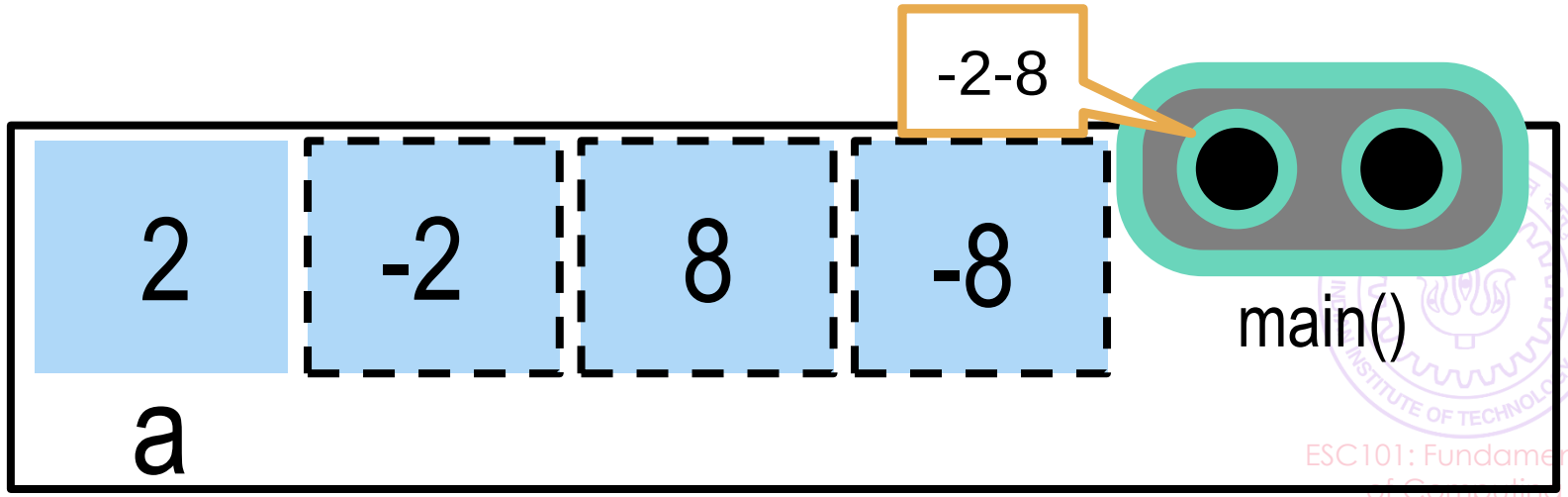

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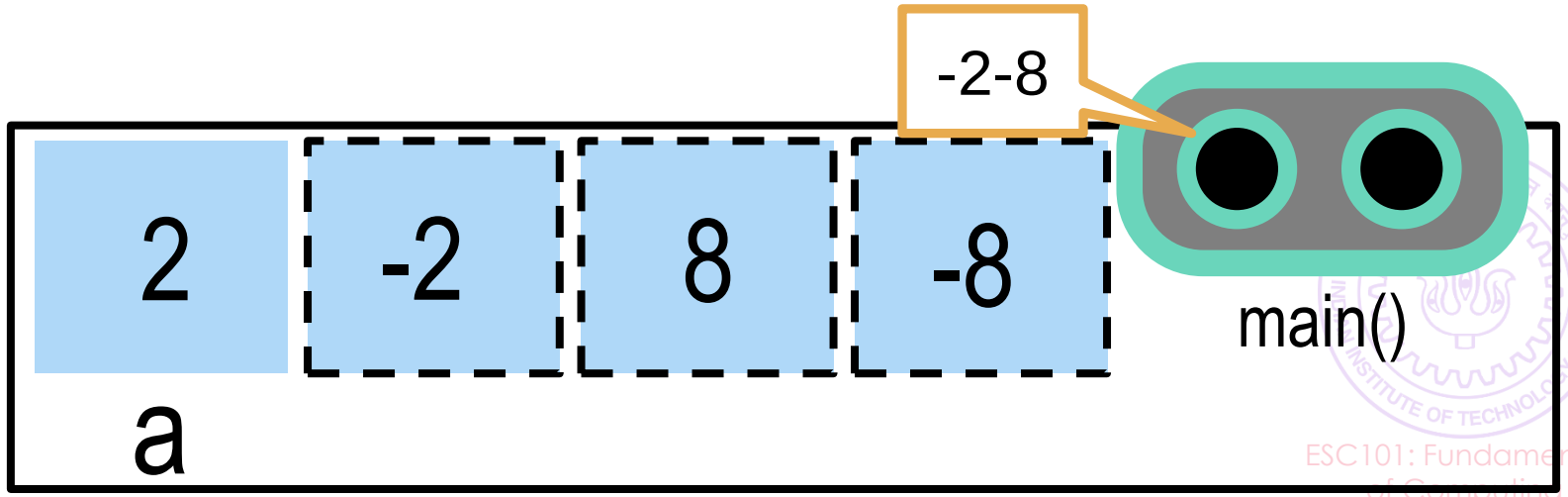

Passing pointers/addresses

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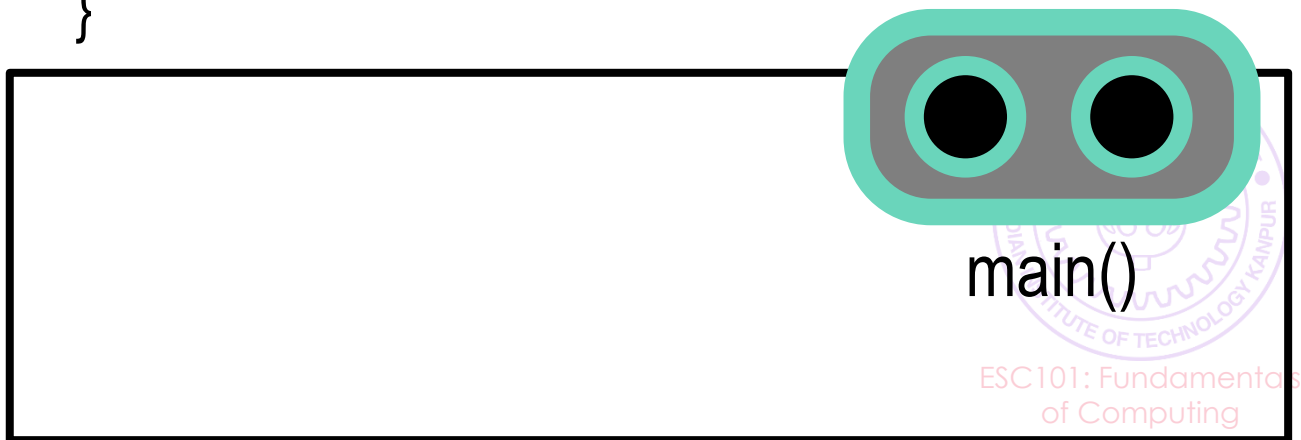

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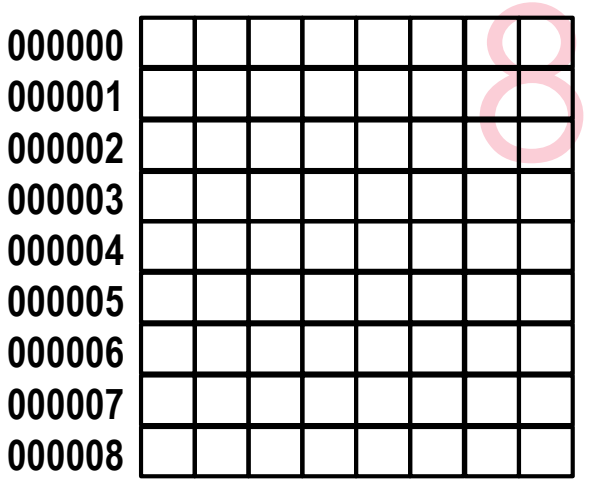

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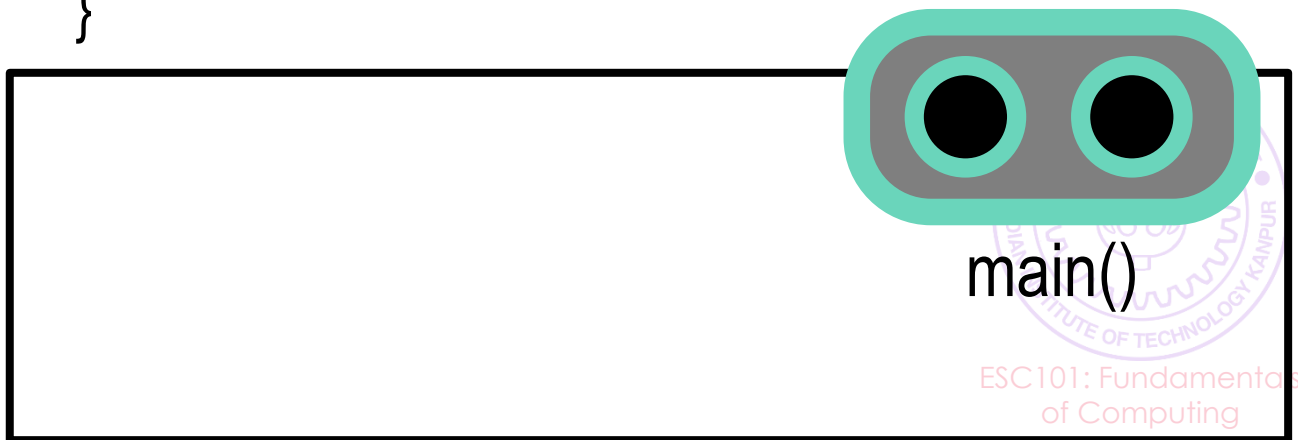

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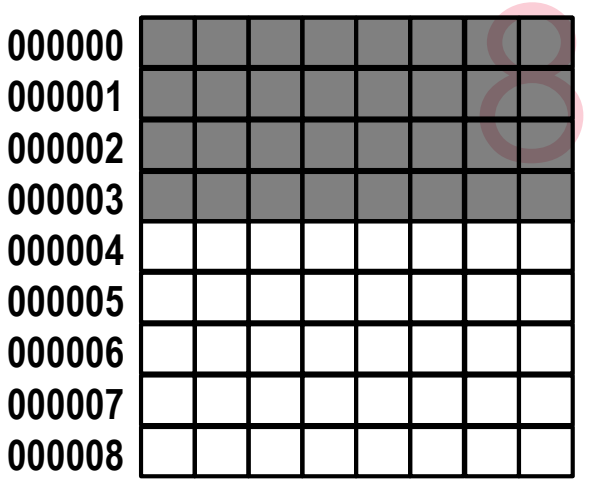

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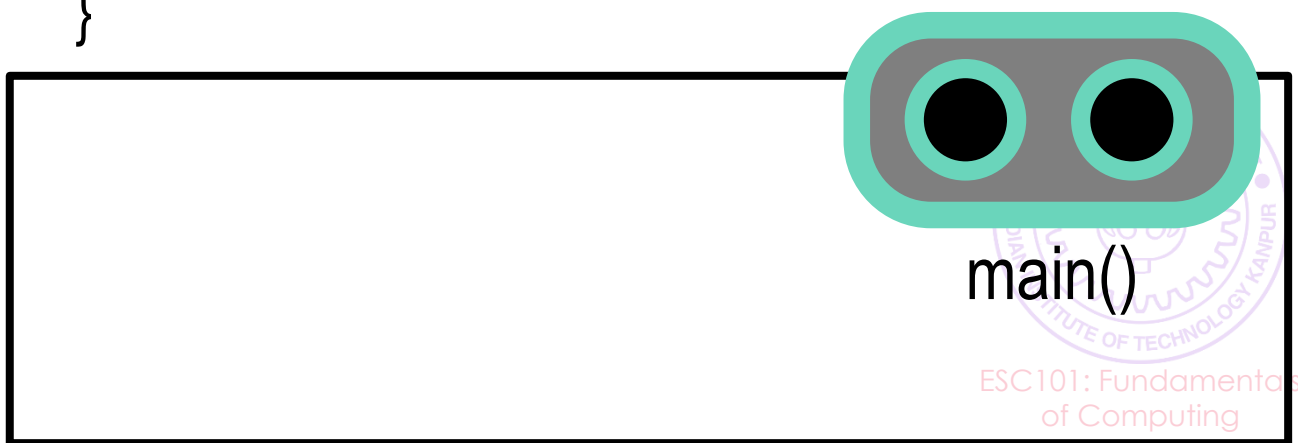

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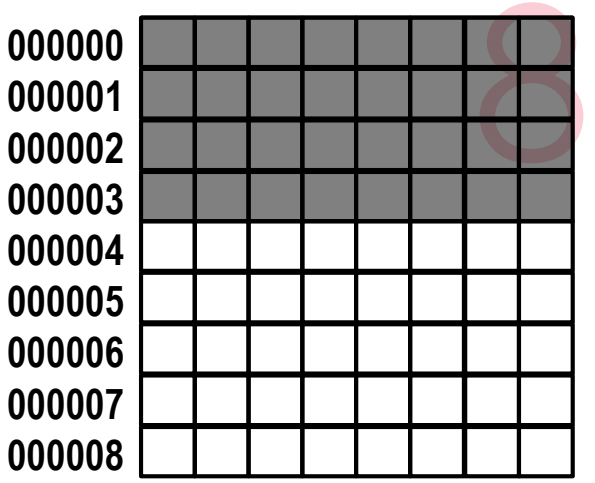

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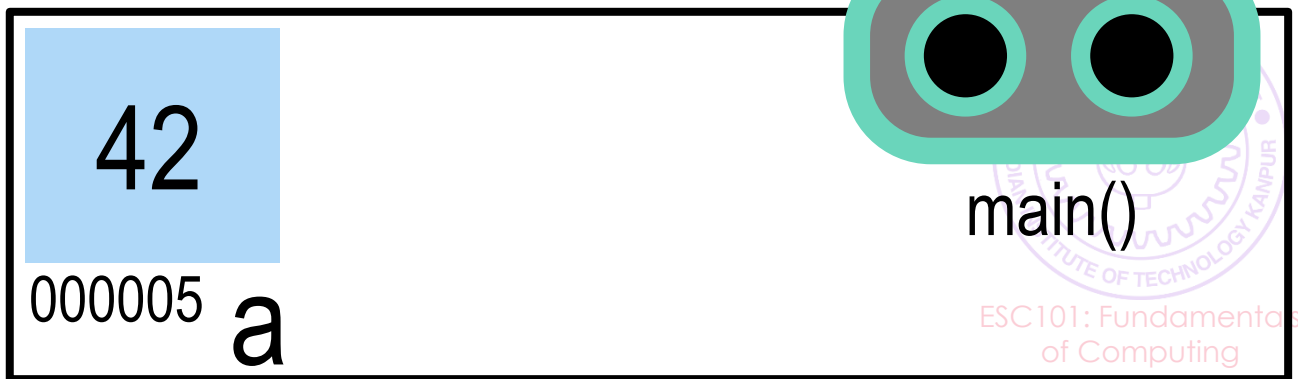

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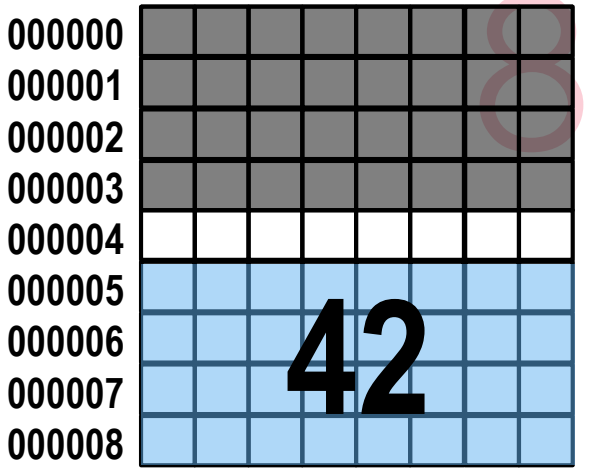

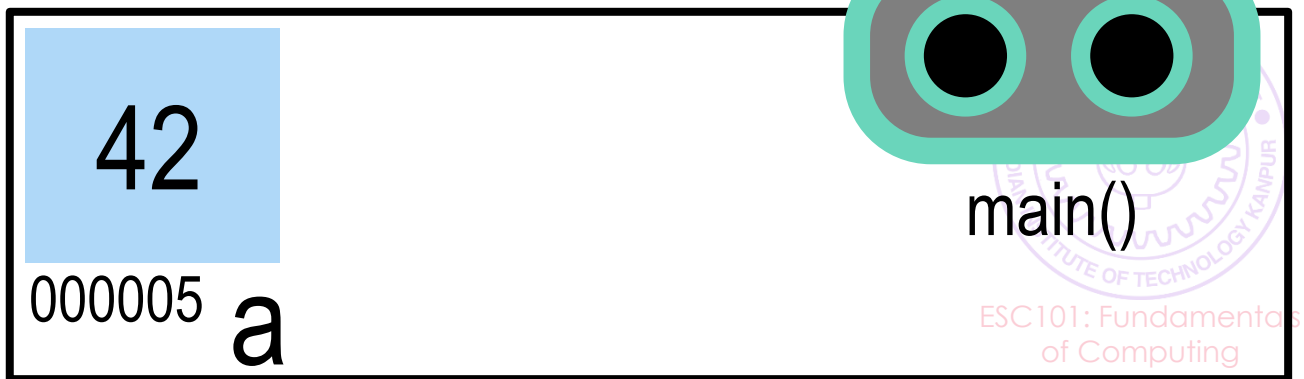

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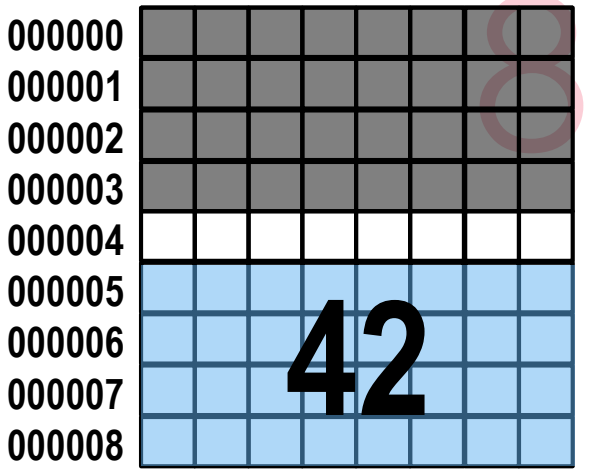

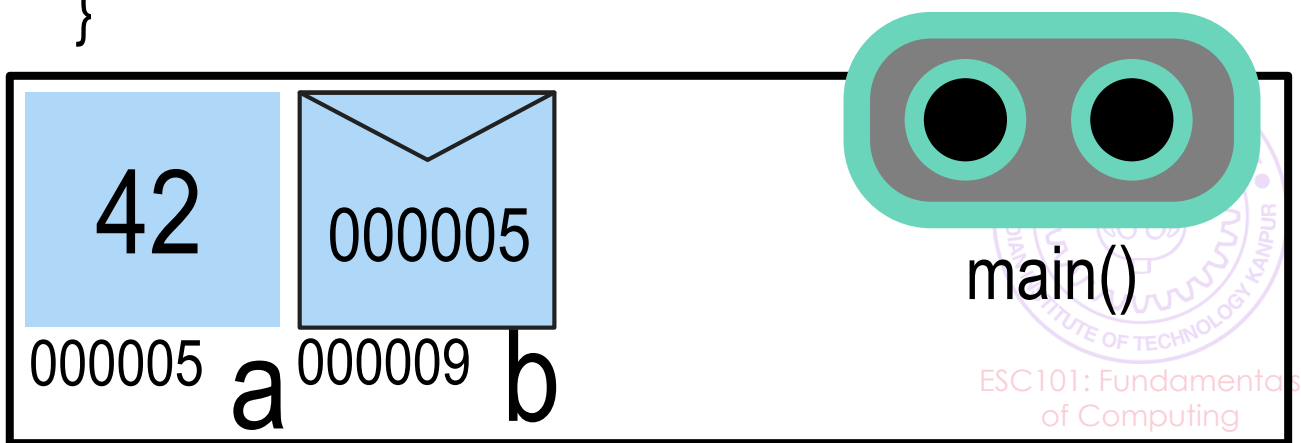

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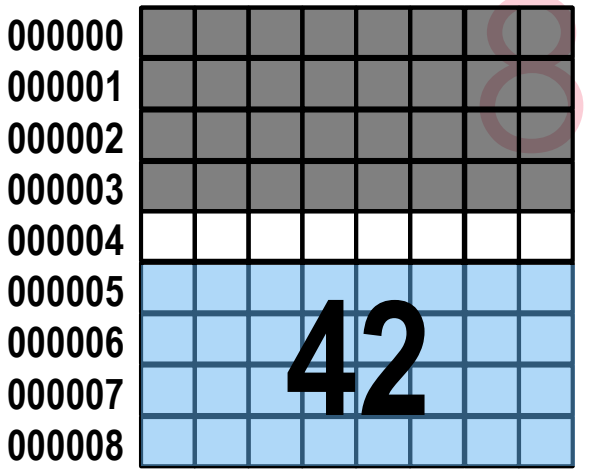

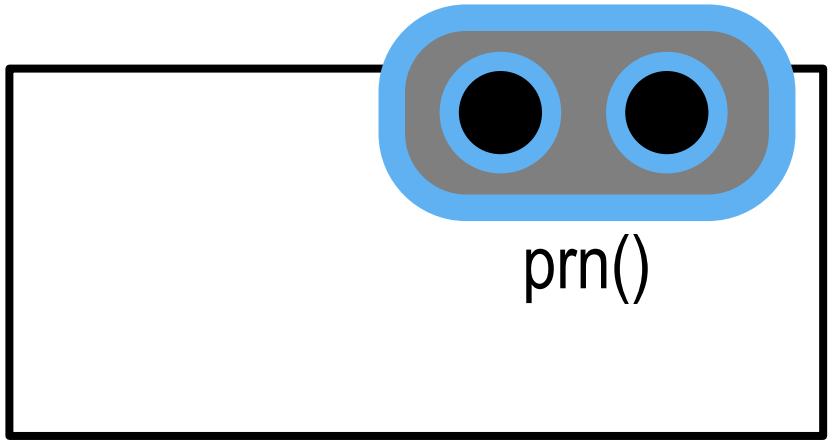

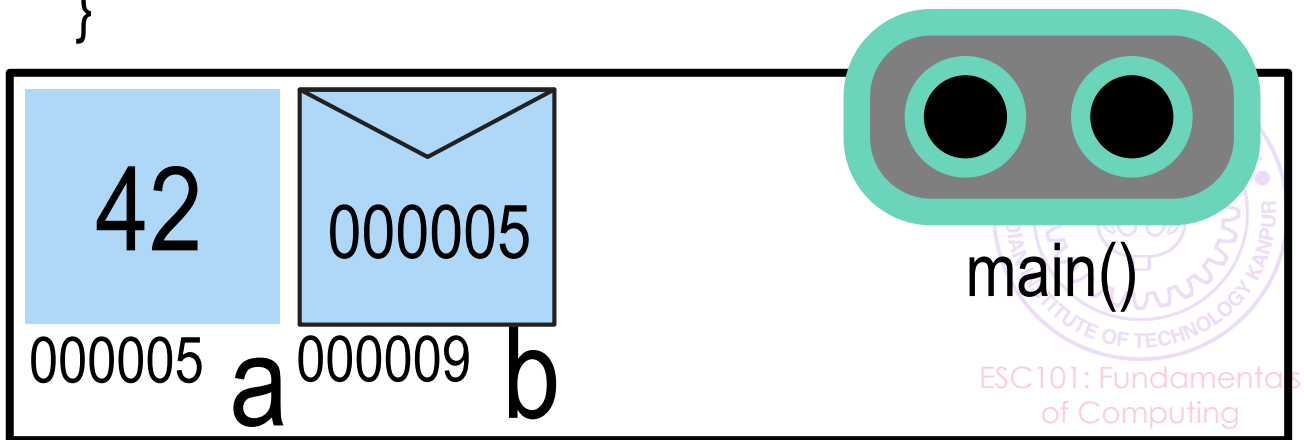

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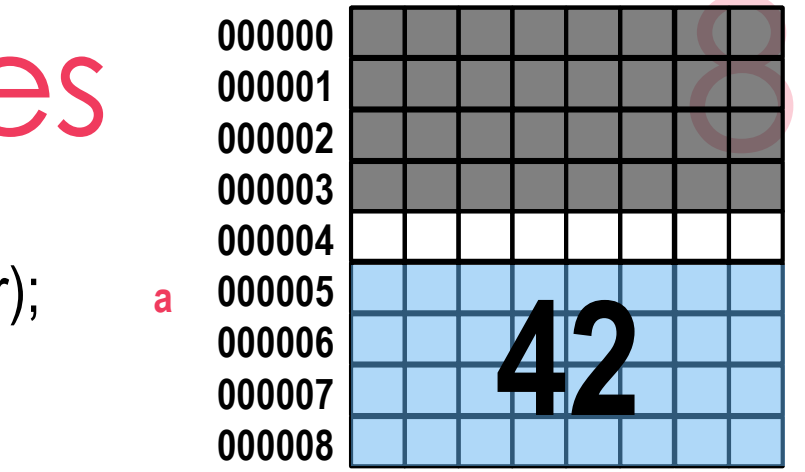

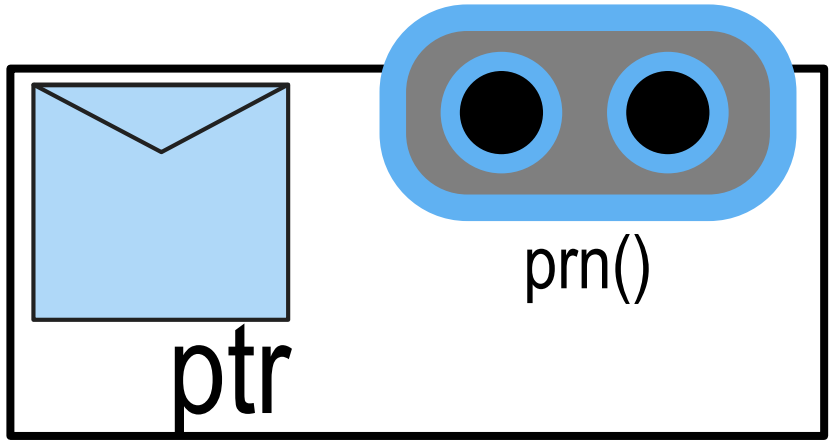

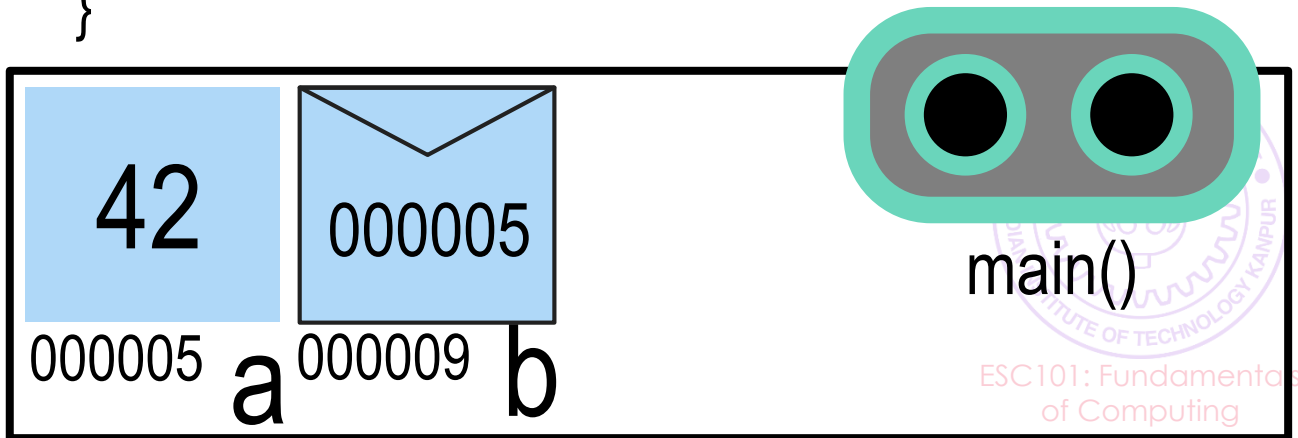

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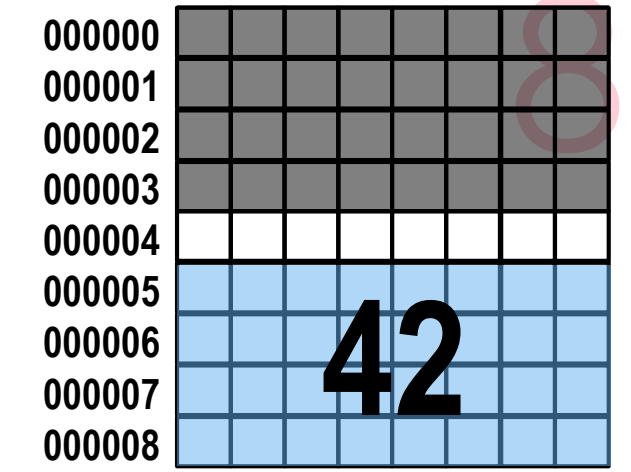

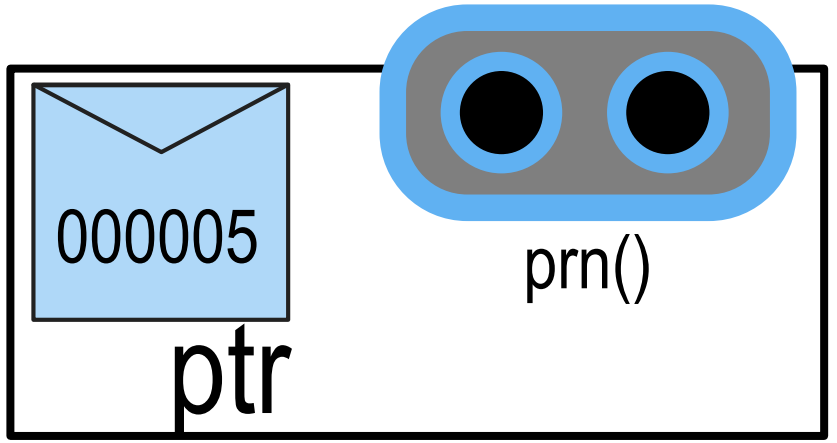

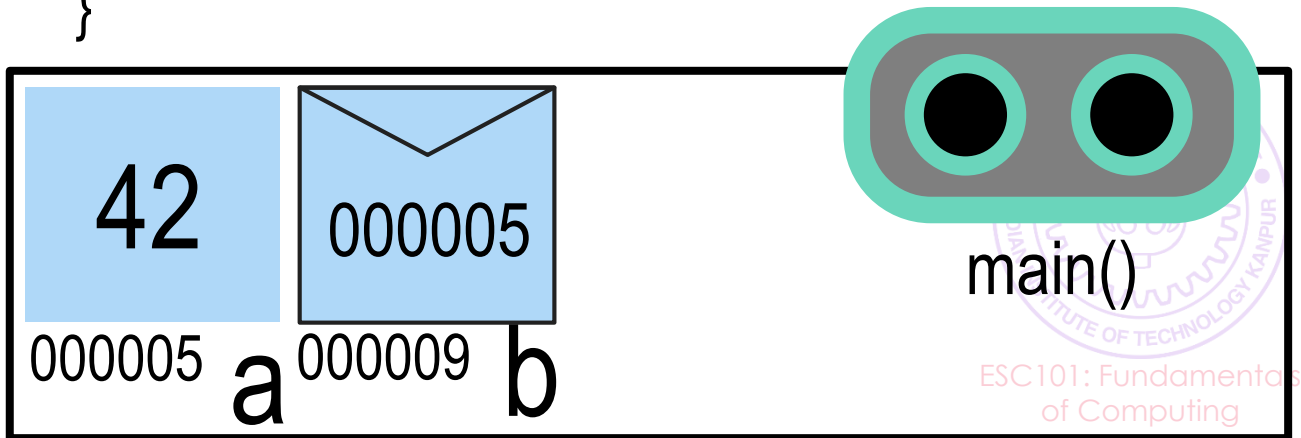

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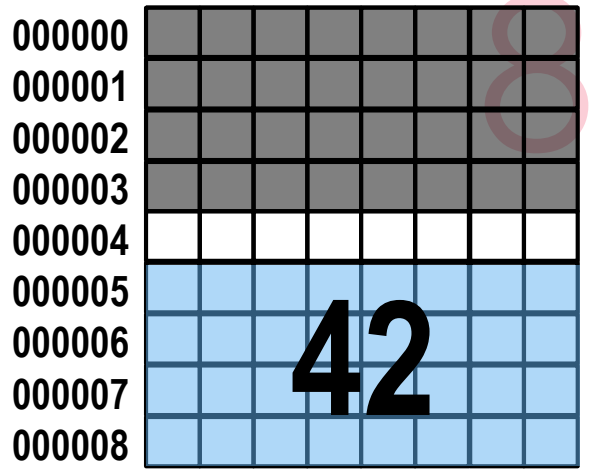

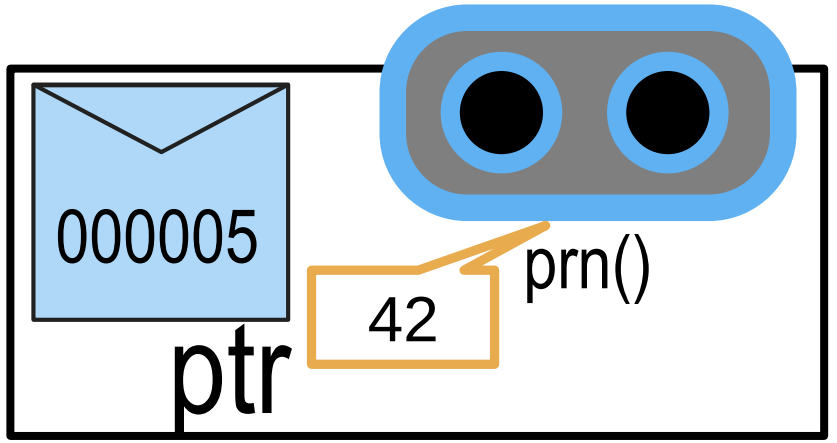

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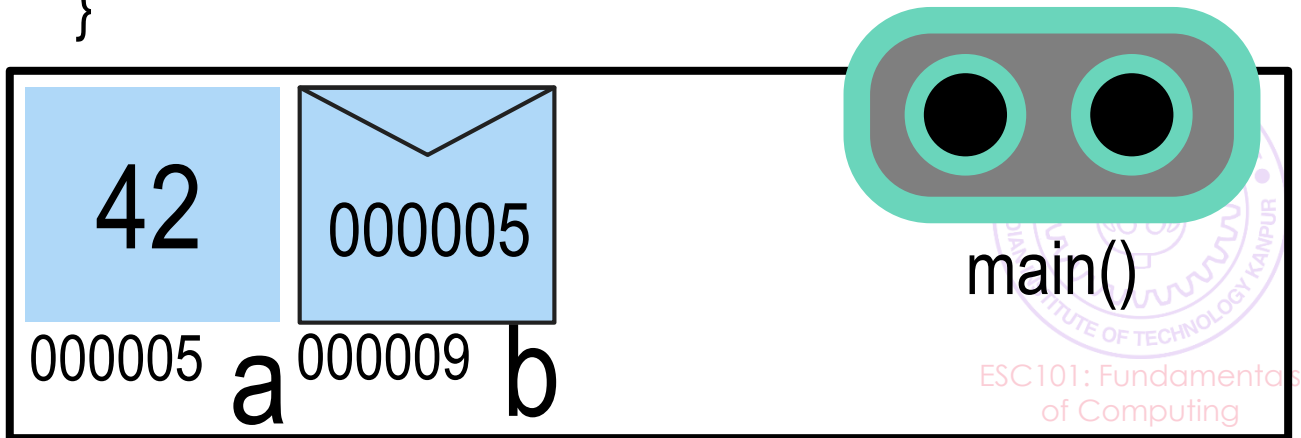

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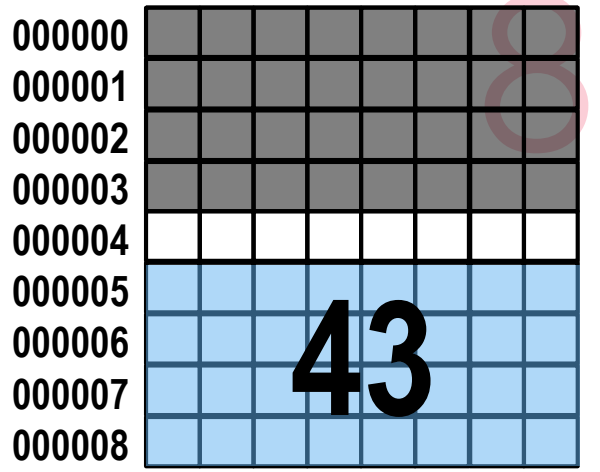

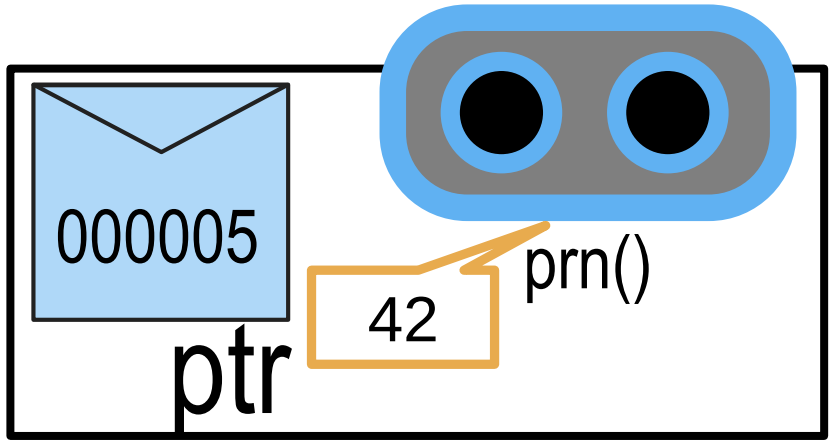

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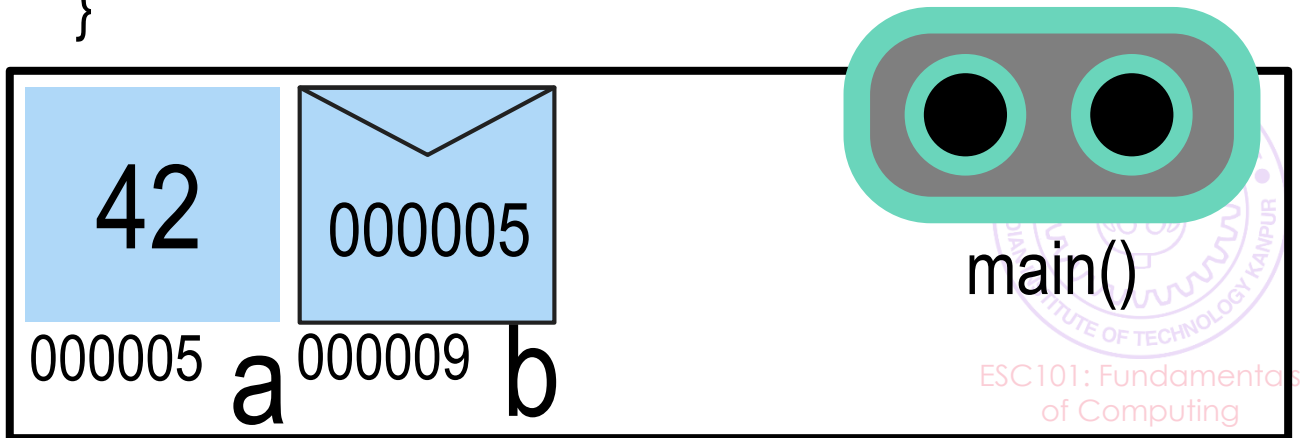

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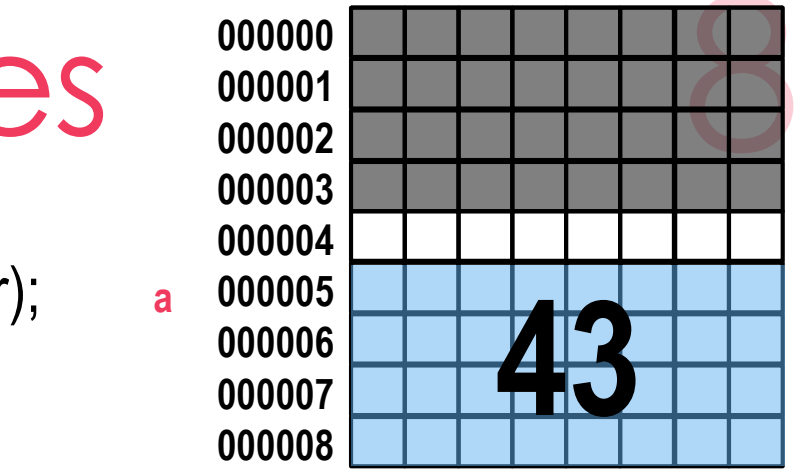

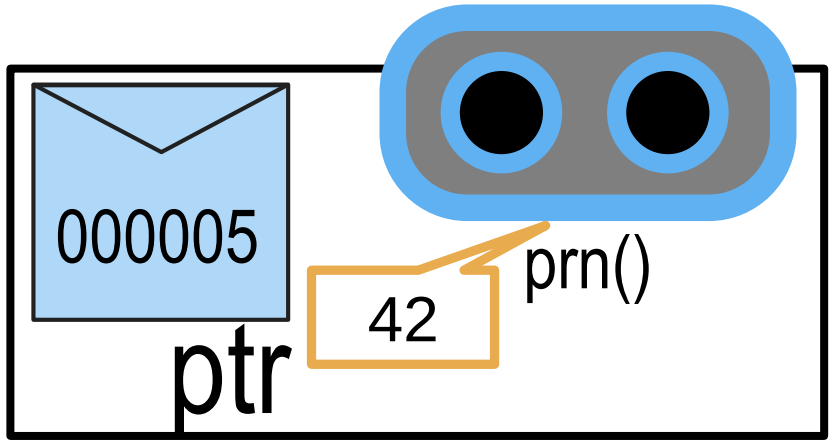

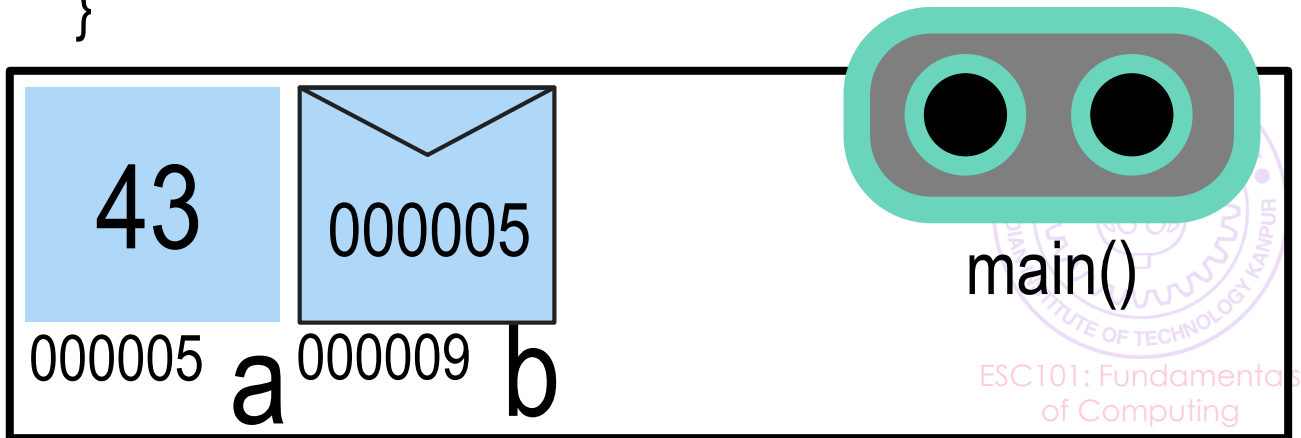

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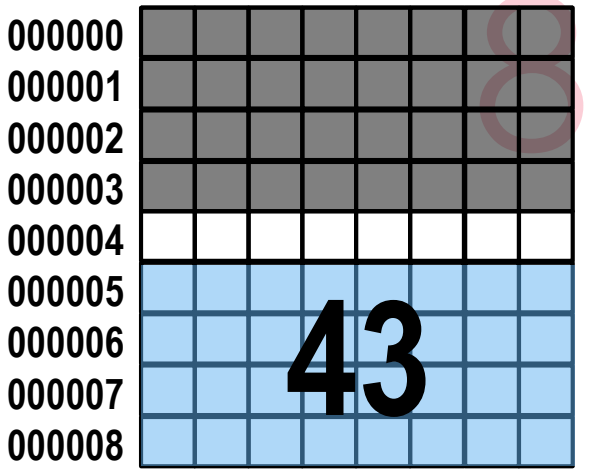

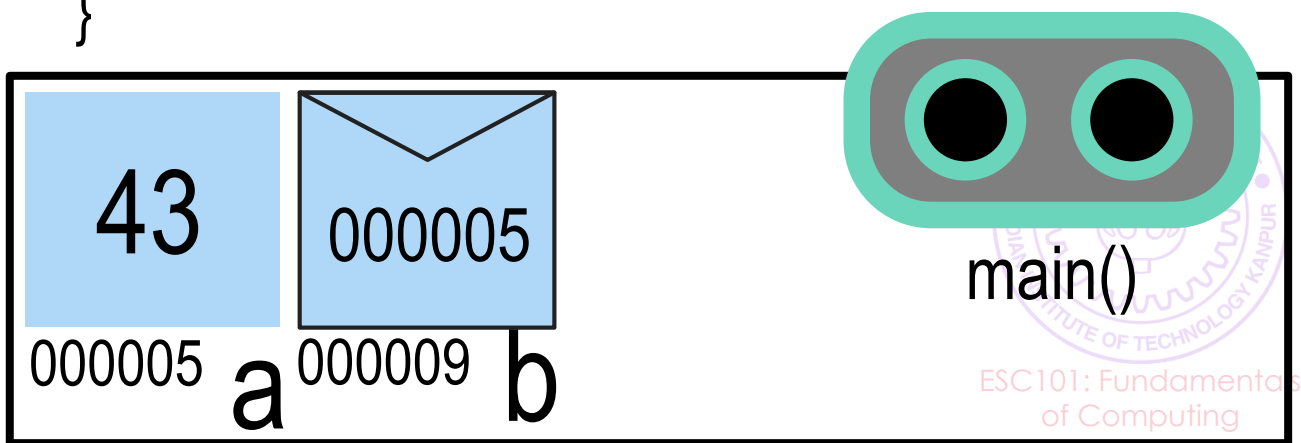

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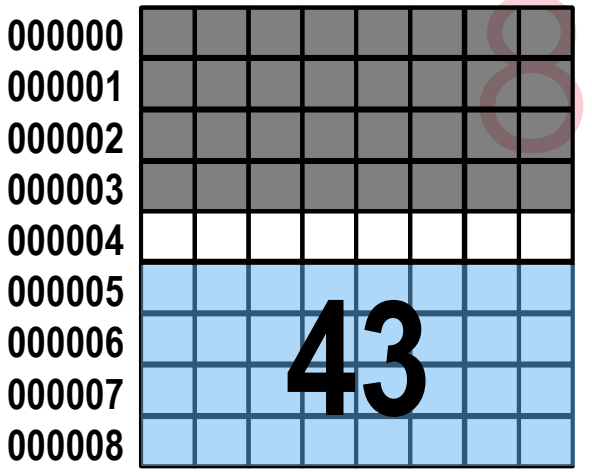

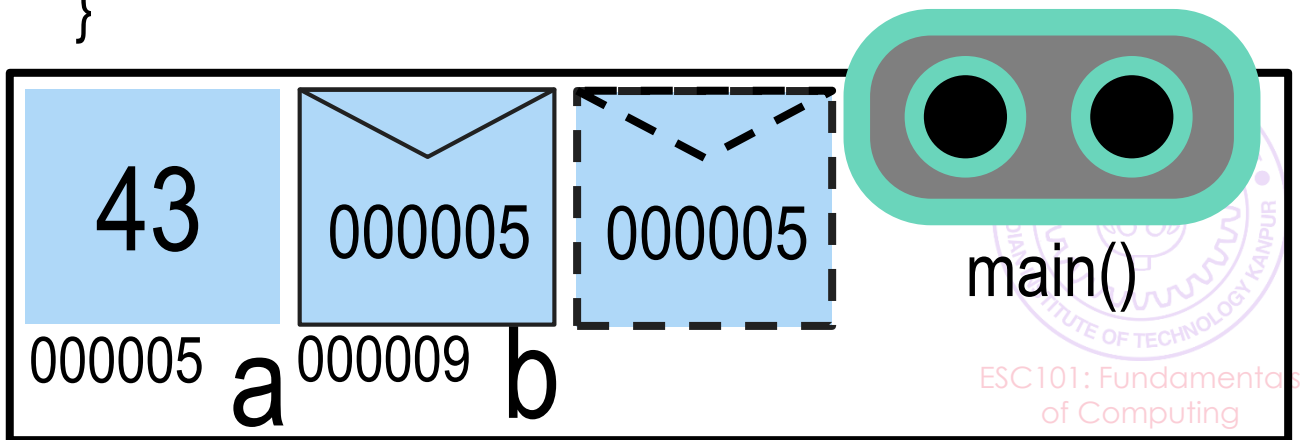

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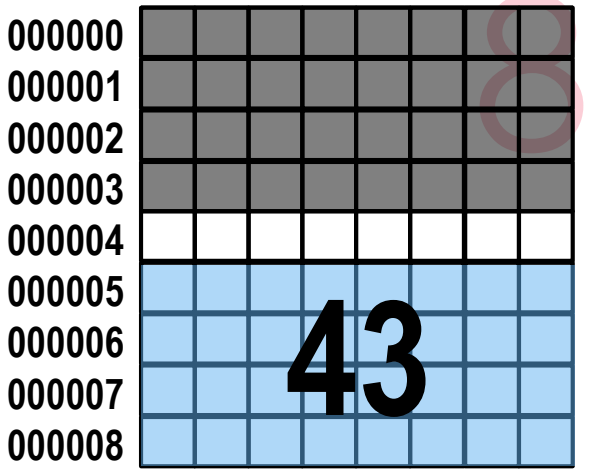

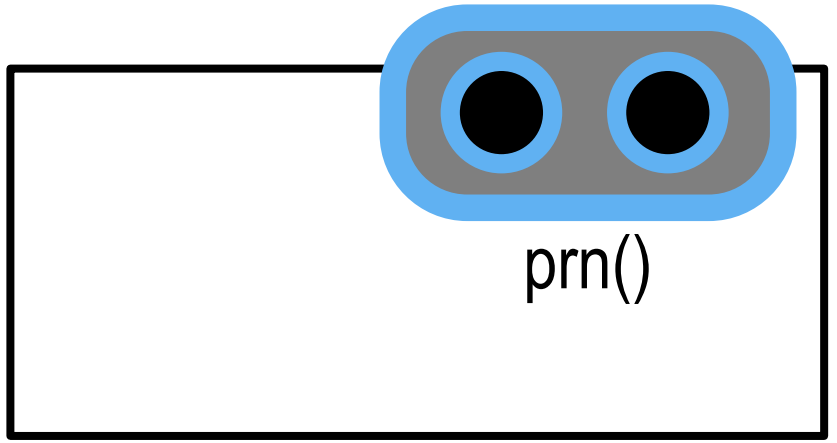

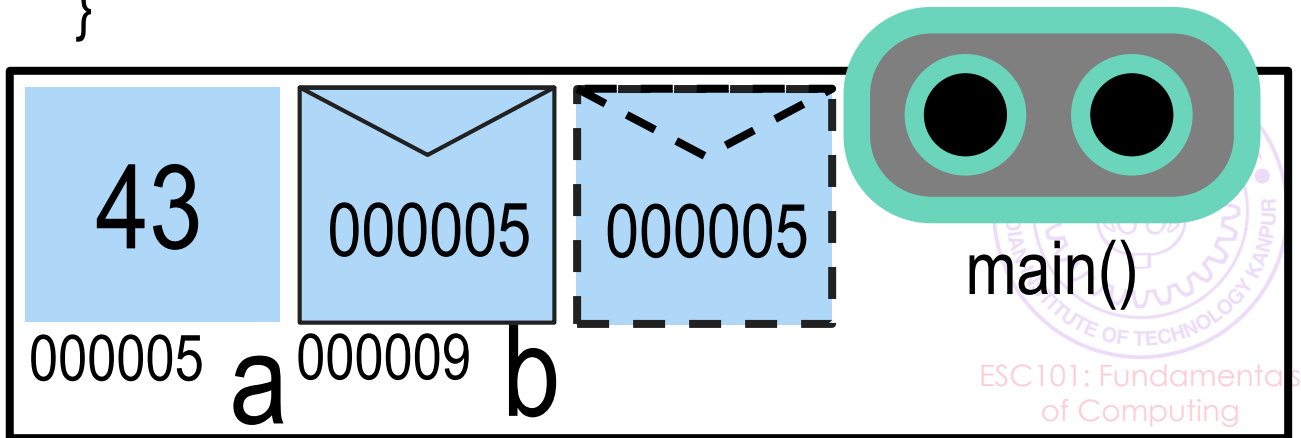

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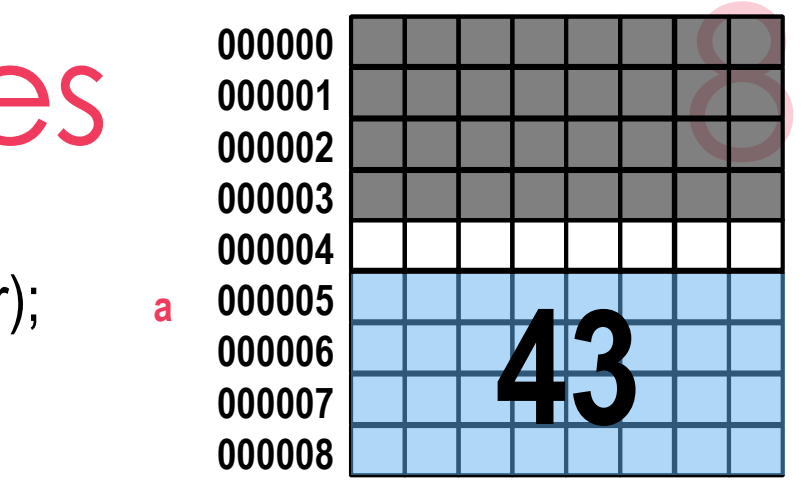

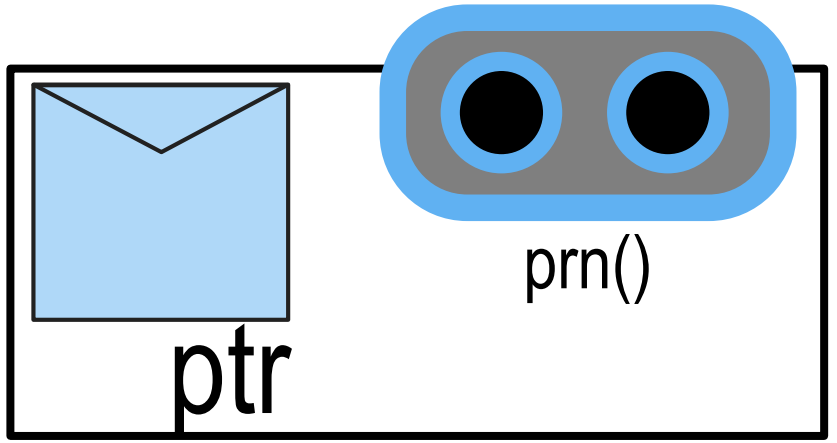

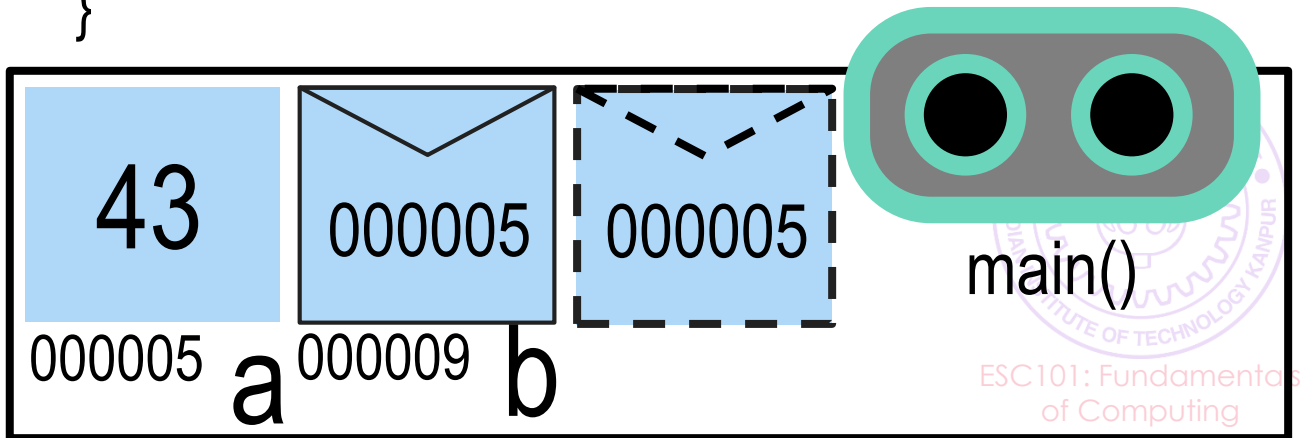

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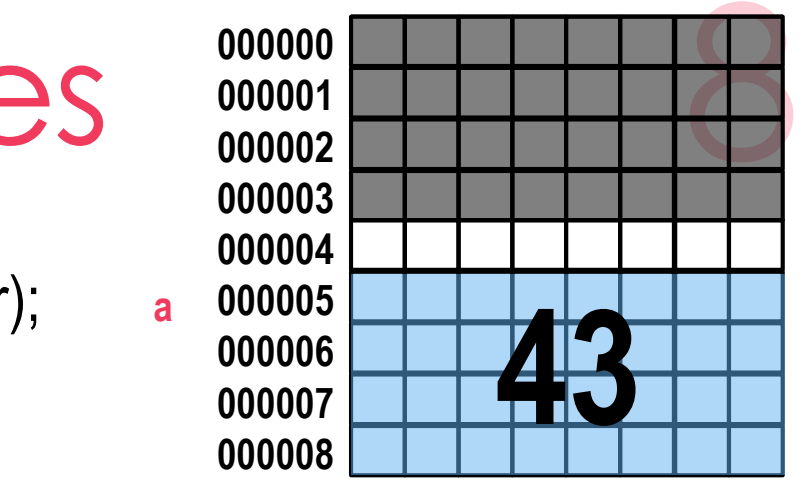

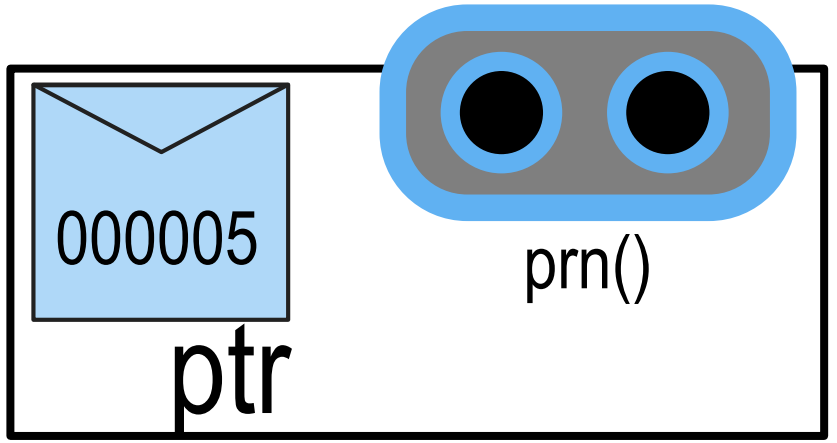

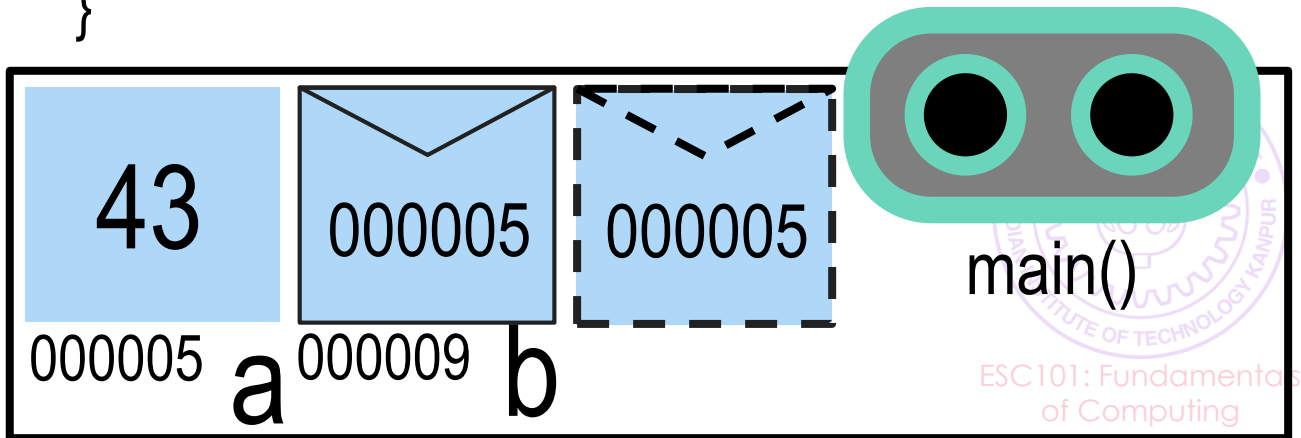

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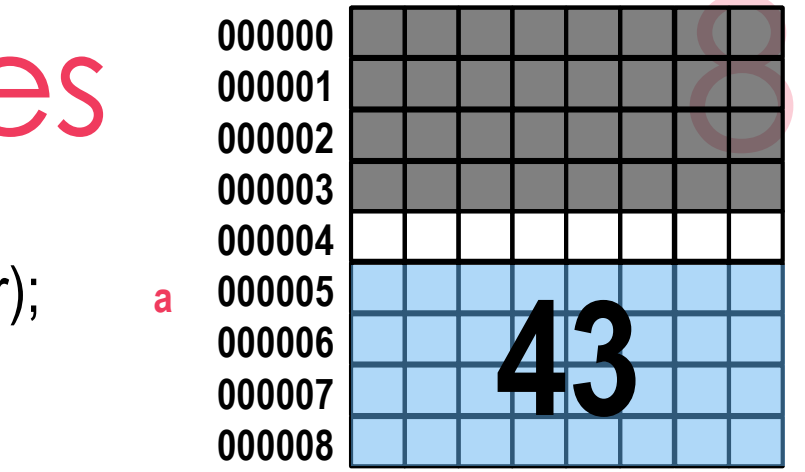

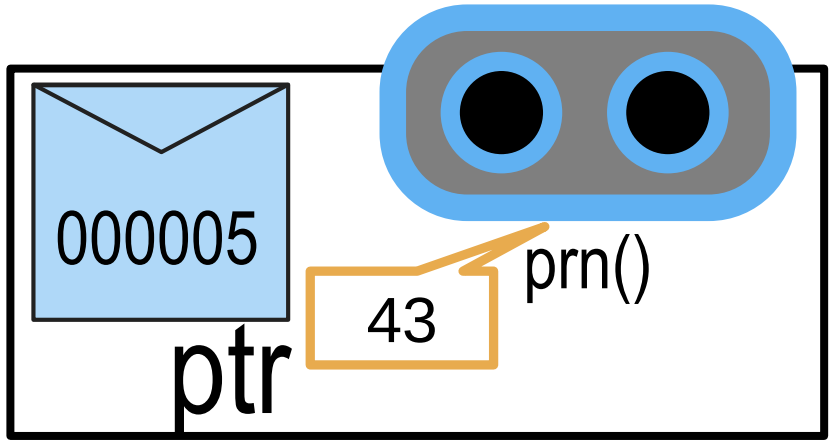

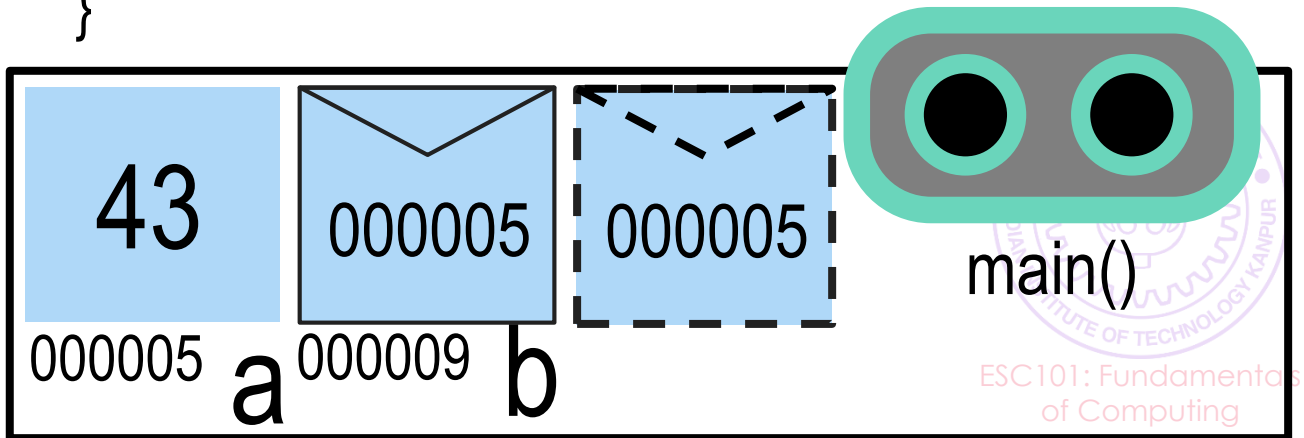

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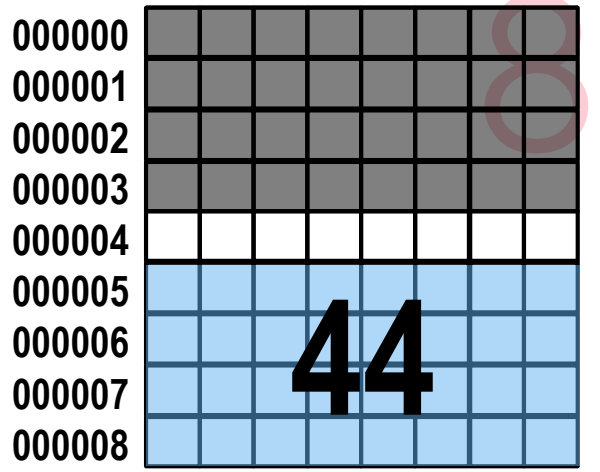

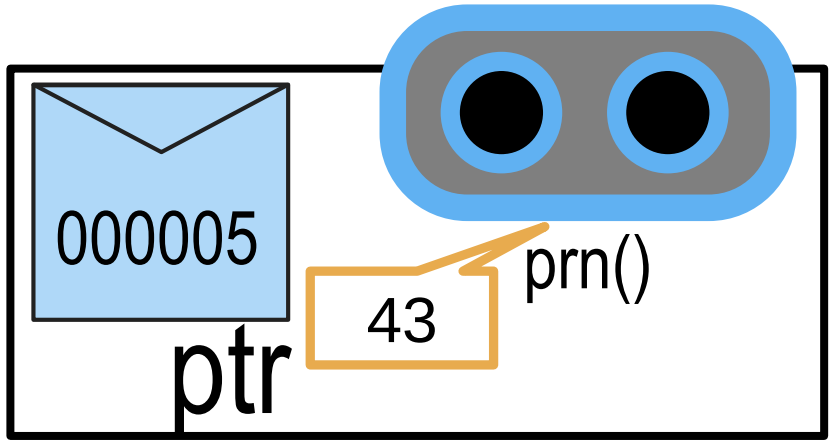

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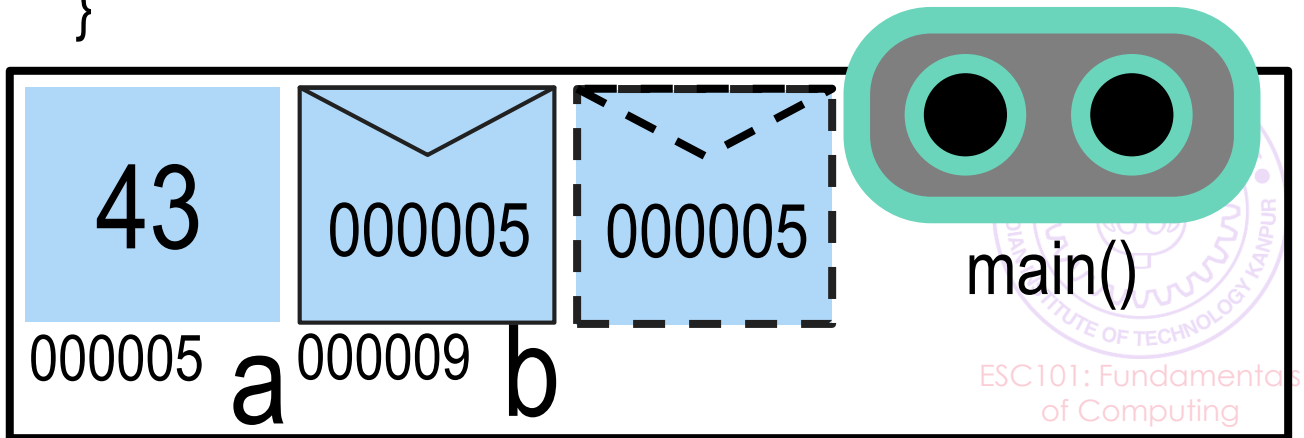

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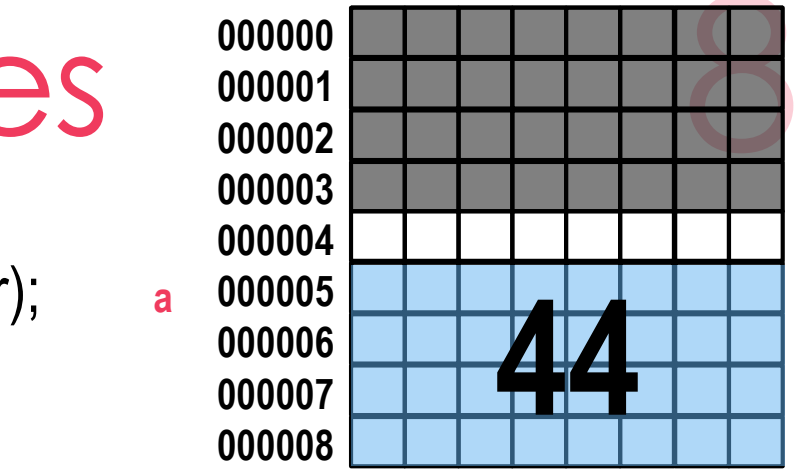

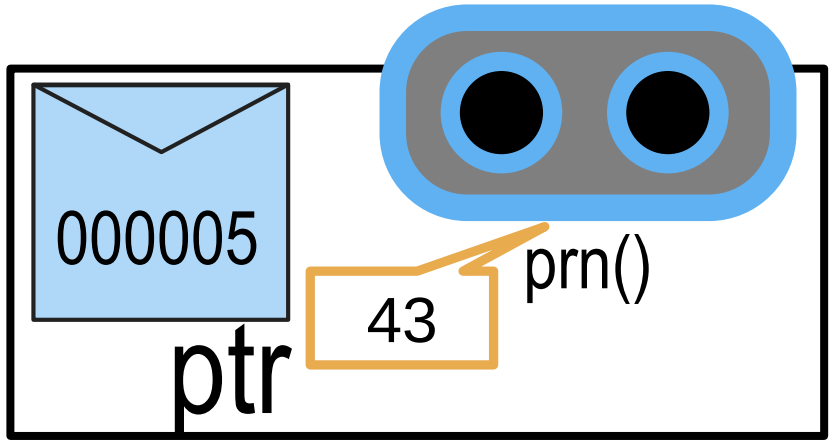

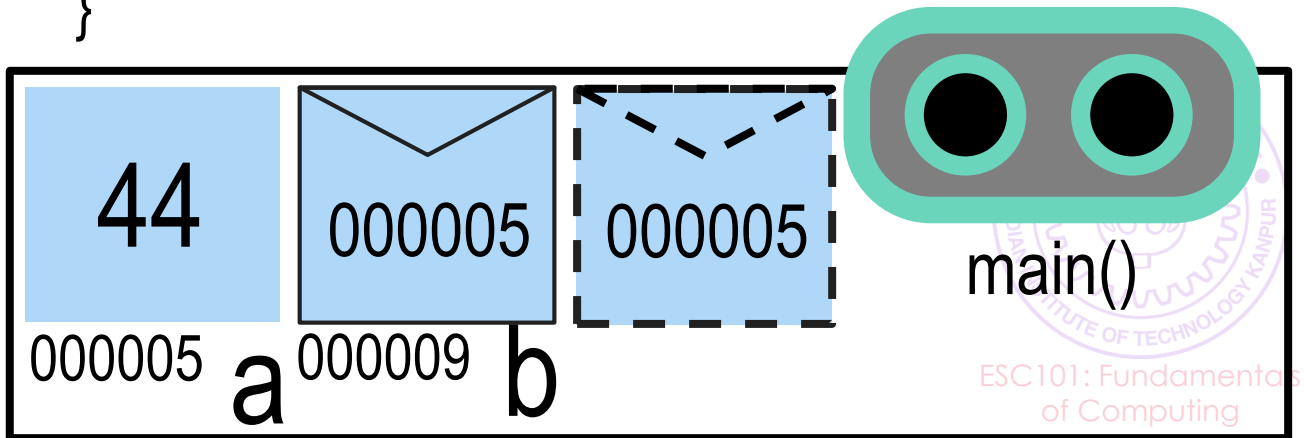

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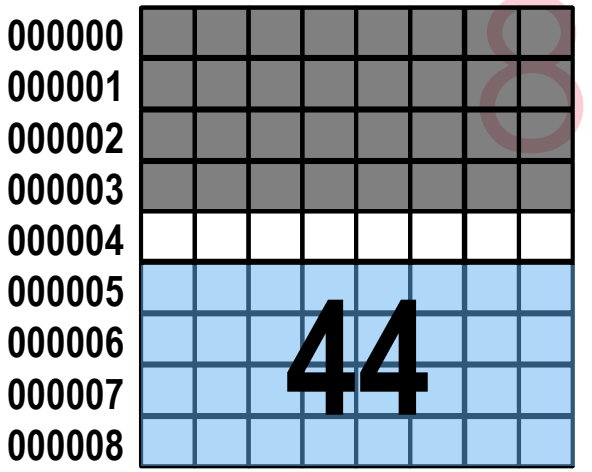

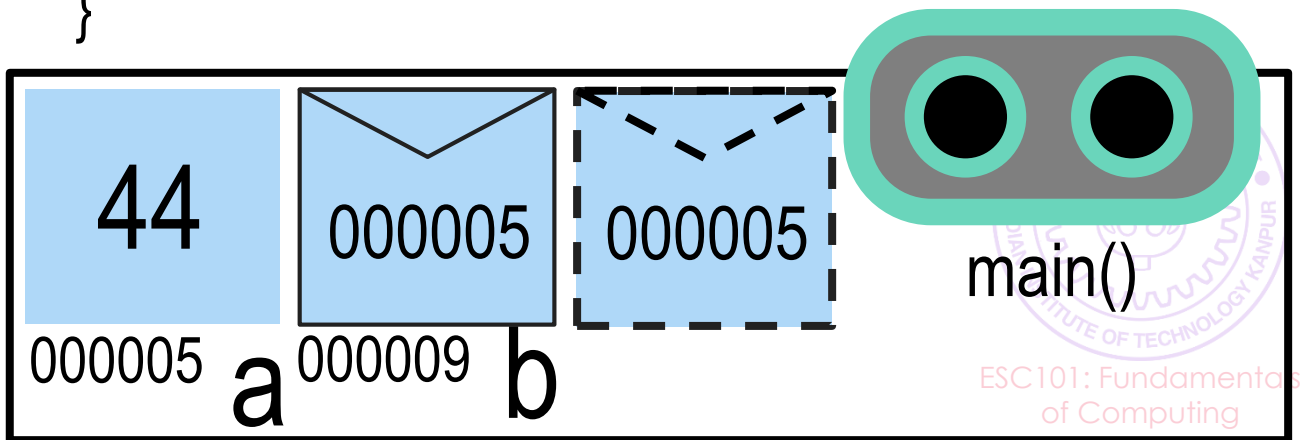

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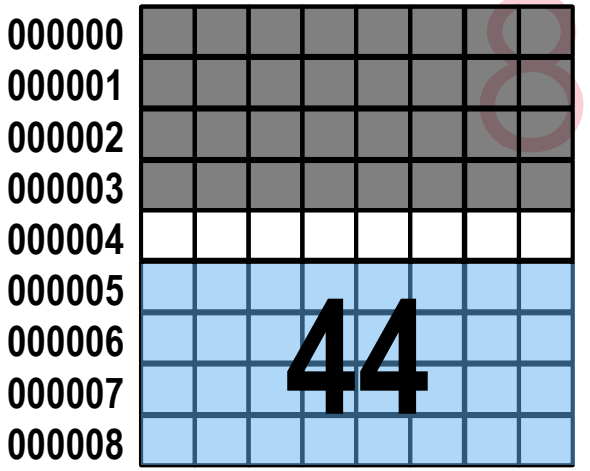

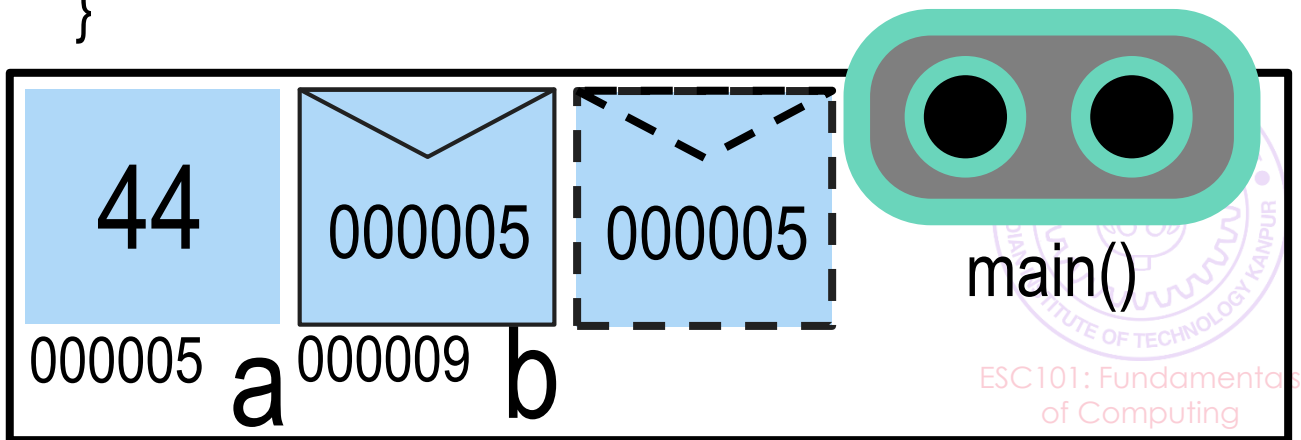

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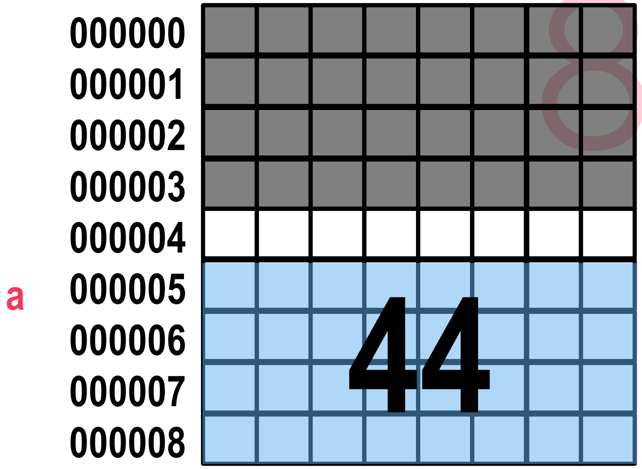

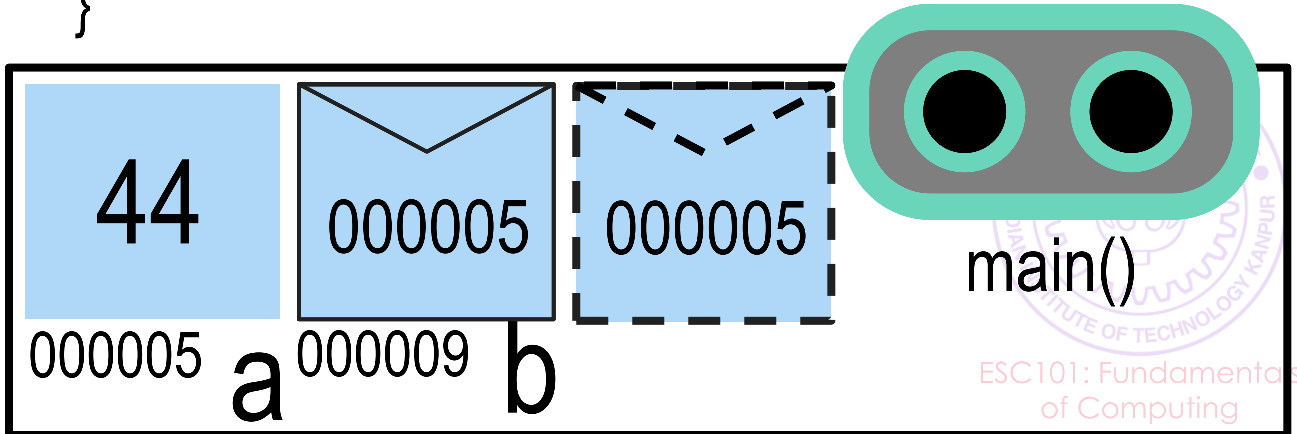

Summary

भारतीय प्रौद्योगिकी संस्थान कानपुर
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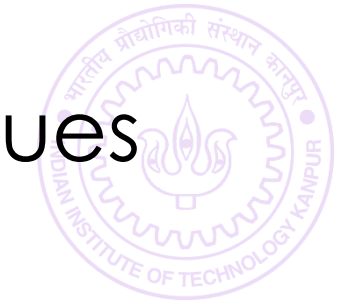
For now, let us see a neat trick to return multiple values



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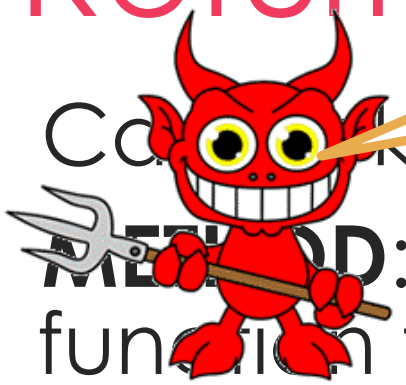


The govt rule on paying only INR 100 is like Mr C's rule of returning only one variable

Ca[illegible] value

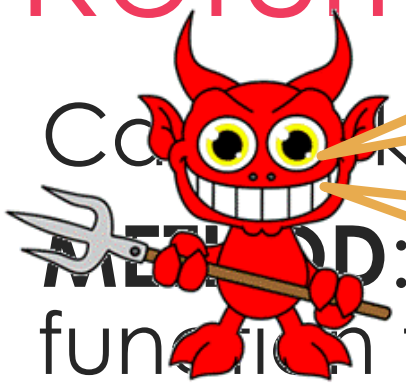
METHOD: pass the address of a variable and ask the function to directly modify that variable – exploit rule 6

- Does not "return" the variable in strictest sense of the term but effectively we get back more values from the function
- Advantage: can return different datatypes using this trick
- Advantage: can return multiple arrays using this trick ☺ (wait for next class)
- Disadvantage: have to be careful handling pointers, memory leaks

Think of this technique as a controlled way of cheating

- **Government rule**: to get passport, only INR 100 can be paid to official
- **Our desire**: pay INR 500 for passport but also INR 500 bribe to get it quickly
- **Problem**: Govt rule prevents us from paying more than INR 100 to official
- **Solution**: Corrupt official gives us his bank account number. We pay official INR 100 the normal route but also directly deposit INR 500 in his bank account

Returning more than one value



The govt rule on paying only INR 100 is like Mr C's rule of returning only one variable

The official giving us his account number is like main() passing the address of a variable to be modified directly

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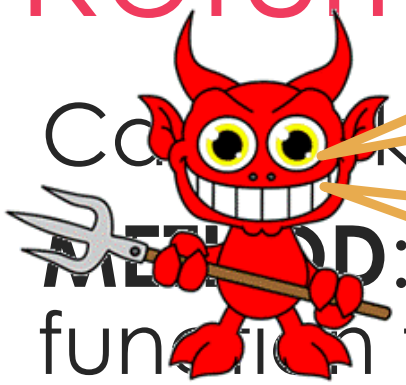

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- …e: co… mult… ays using this trick ☺ (wait for next class)
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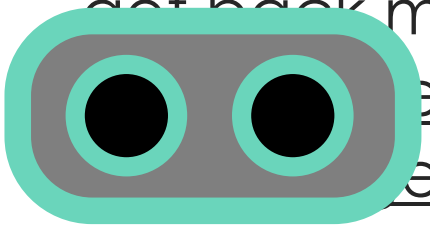

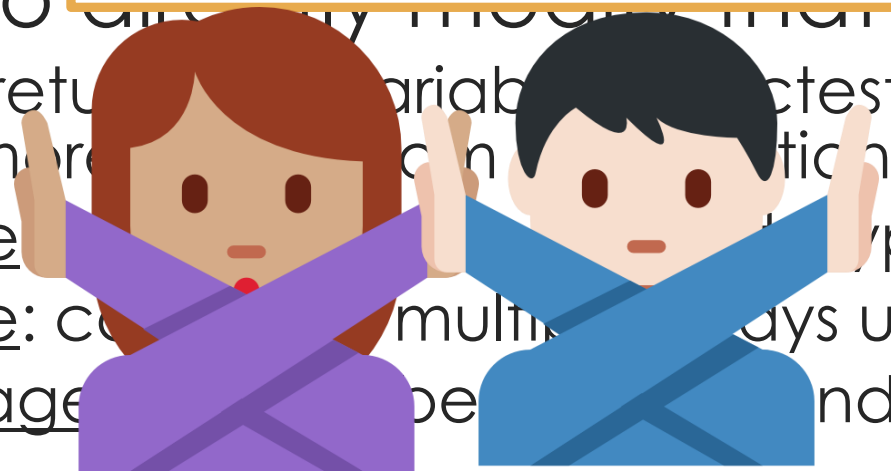

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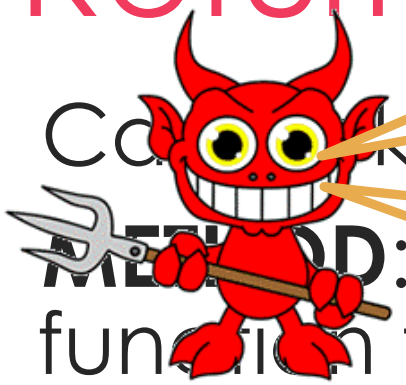

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The official giving us his account number is like main() passing the address of a variable to be modified directly

Never pay bribes, kickbacks in real life

Ca… Mr C's rule returning more than one value

METHOD: p… e function to already modified that variable – explain rule 6

Does not "retu… ariab… ctest s… effectively we get back m… n… tio…

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Disadvantage… pe… ndling pointers, memory leaks

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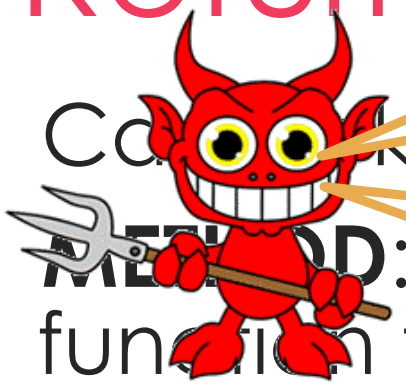

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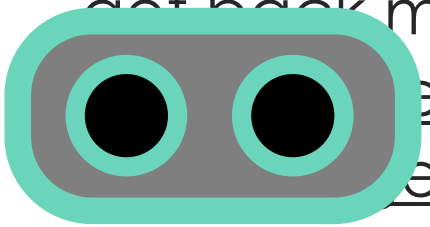

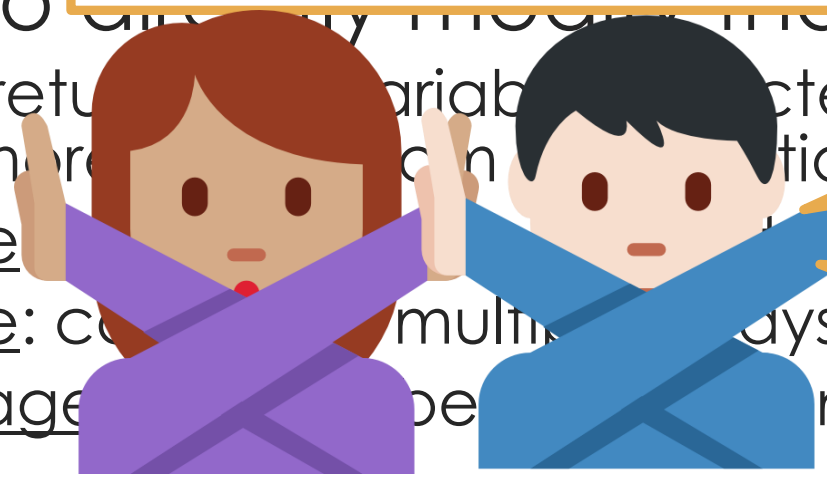

Never pay bribes, kickbacks in real life

Corrupt behaviour is detrimental to society

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