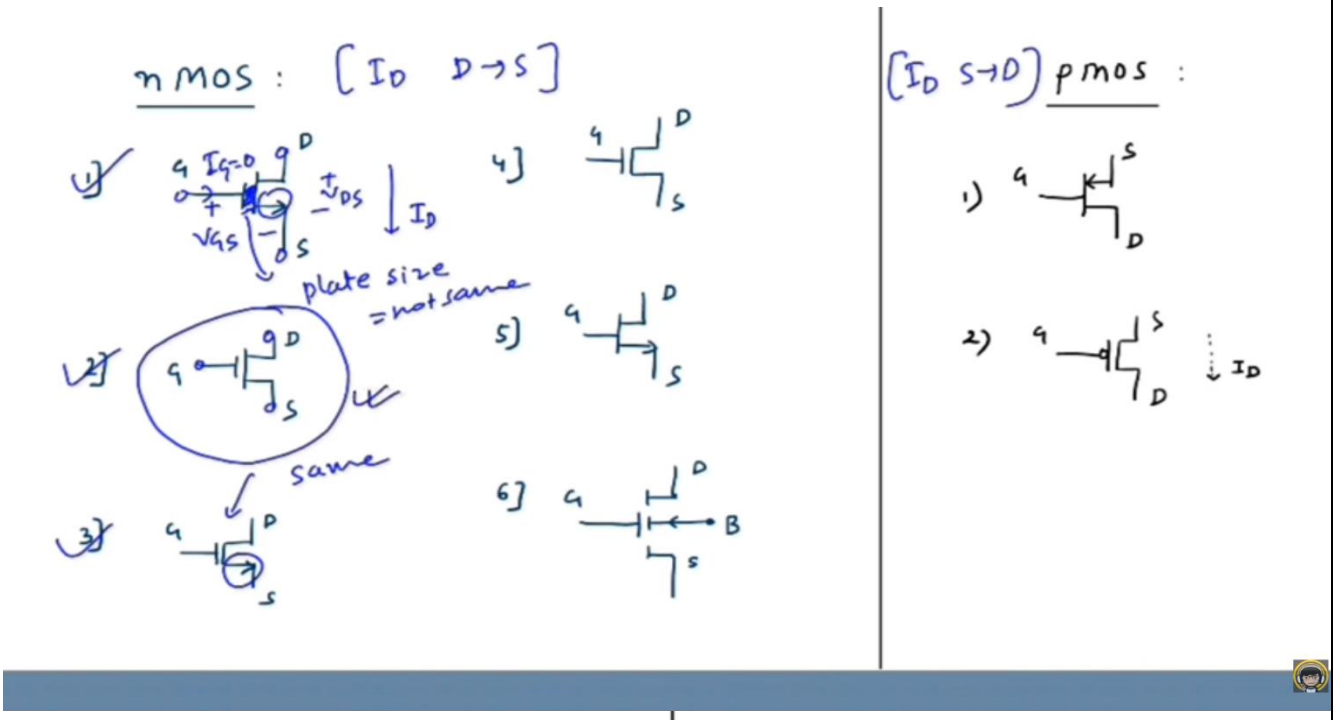
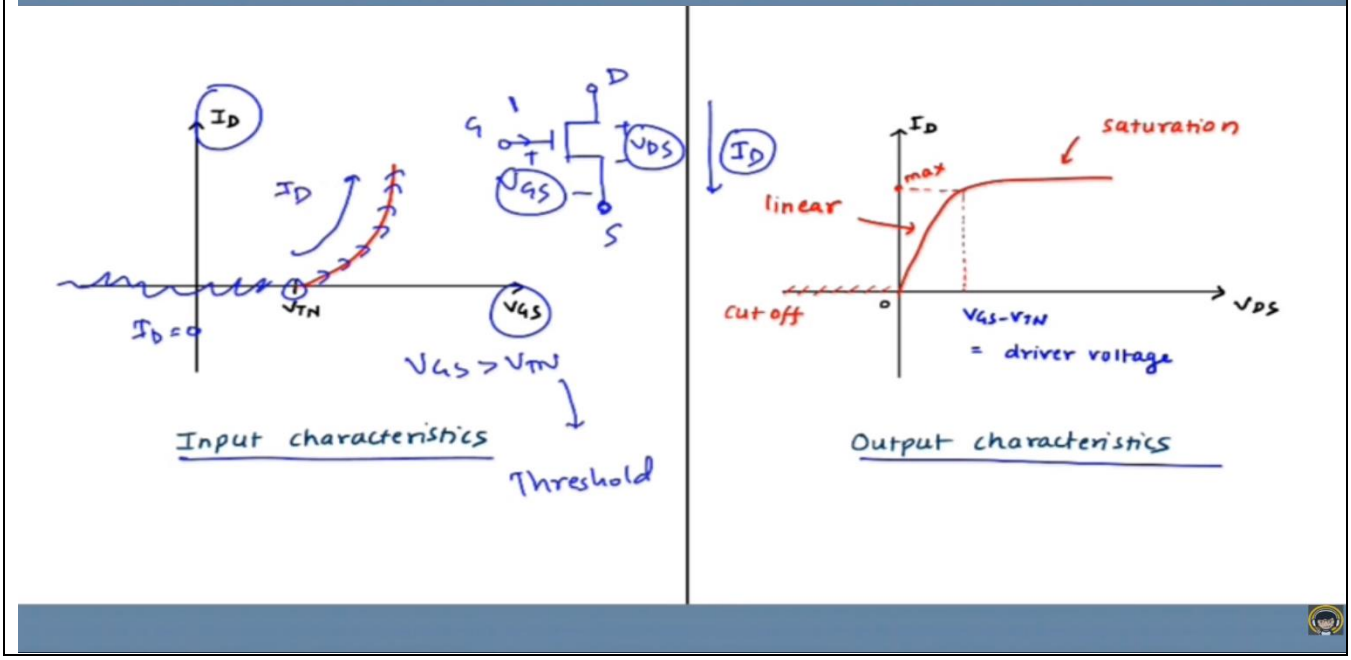
DAILY ASSESSMENT FORMAT

Date:	12th June 2020	**Name:**	Soundarya NA
Course:	VLSI	**USN:**	4AL16EC077
Topic:	VLSI	**Semester & Section:**	8th - B

FORENOON SESSION DETAILS

Image of session



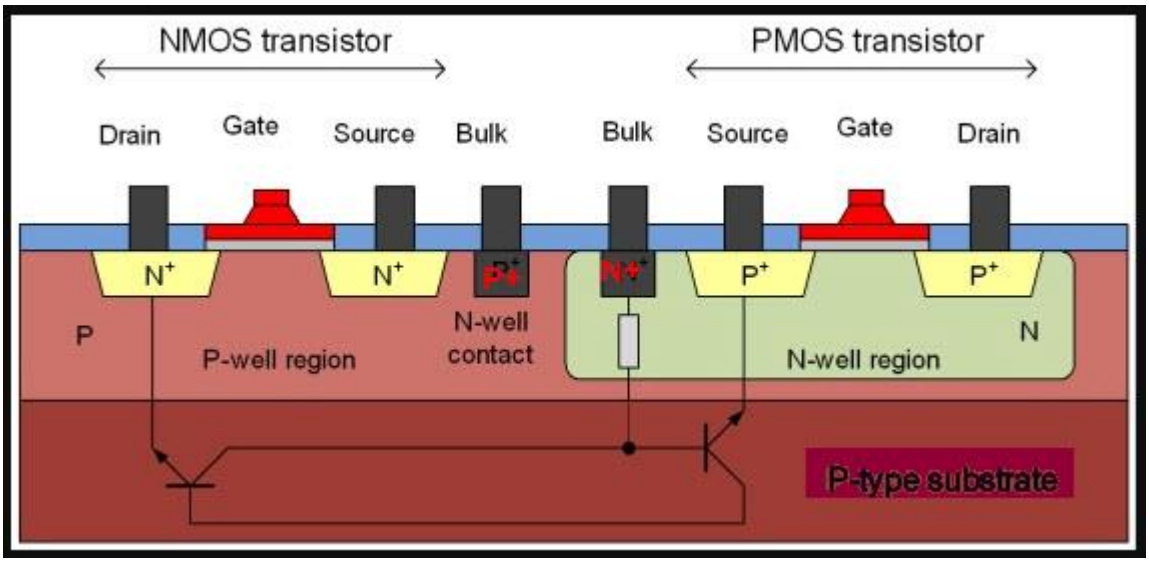


Report:

The term CMOS stands for "Complementary Metal Oxide Semiconductor". CMOS technology is one of the most popular technology in the computer chip design industry and broadly used today to form integrated circuits in numerous and varied applications. Today's computer memories, CPUs and cell phones make use of this technology due to several key advantages. This technology makes use of both P channel and N channel semiconductor devices.

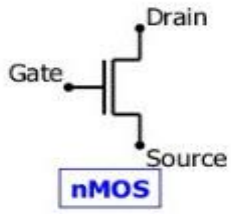
One of the most popular MOSFET technologies available today is the Complementary MOS or CMOS technology. This is the dominant semiconductor technology for microprocessors, microcontroller chips, memories like RAM, ROM, EEPROM and application specific integrated circuits (ASICs).

The main advantage of CMOS over NMOS and BIPOLAR technology is the much smaller power dissipation. Unlike NMOS or BIPOLAR circuits, a Complementary MOS circuit has almost no static power dissipation. Power is only dissipated in case the circuit actually switches. This allows integrating more CMOS gates on an IC than in NMOS or bipolar technology, resulting in much better performance. Complementary Metal Oxide Semiconductor transistor consists of P-channel MOS (PMOS) and N-channel MOS (NMOS). Please refer the link to know more about the fabrication process of CMOS transistor.



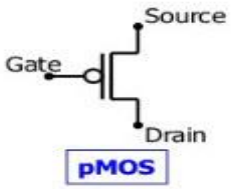
NMOS:

NMOS is built on a p-type substrate with n-type source and drain diffused on it. In NMOS, the majority carriers are electrons. When a high voltage is applied to the gate, the NMOS will conduct. Similarly, when a low voltage is applied to the gate, NMOS will not conduct. NMOS are considered to be faster than PMOS, since the carriers in NMOS, which are electrons, travel twice as fast as the holes.



PMOS:

P- channel MOSFET consists P-type Source and Drain diffused on an N-type substrate. Majority carriers are holes. When a high voltage is applied to the gate, the PMOS will not conduct. When a low voltage is applied to the gate, the PMOS will conduct. The PMOS devices are more immune to noise than NMOS devices.

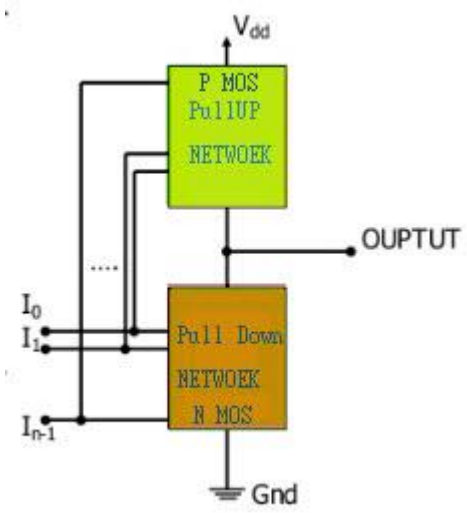


CMOS working principle:

In CMOS technology, both N-type and P-type transistors are used to design logic functions. The same signal which turns ON a transistor of one type is used to turn OFF a transistor of the other type. This characteristic allows the design of logic devices using only simple switches, without the need for a pull-up resistor.

In CMOS logic gates a collection of n-type MOSFETs is arranged in a pull-down network between the output and the low voltage power supply rail (Vss or quite often ground). Instead of the load resistor of NMOS logic gates, CMOS logic gates have a collection of p-type MOSFETs in a pull-up network between the output and the higher-voltage rail (often named Vdd).

Thus, if both a p-type and n-type transistor have their gates connected to the same input, the p-type MOSFET will be ON when the n-type MOSFET is OFF, and vice-versa. The networks are arranged such that one is ON and the other OFF for any input pattern as shown in the figure below.

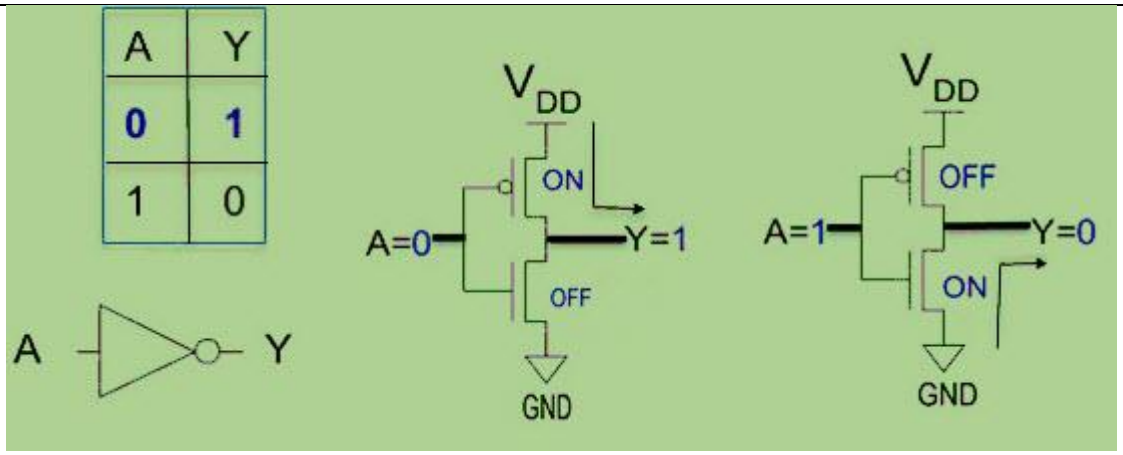


CMOS Logic Gate using Pull-Up and Pull-Down Networks

CMOS offers relatively high speed, low power dissipation, high noise margins in both states, and will operate over a wide range of source and input voltages (provided the source voltage is fixed). Furthermore, for the better understanding of the Complementary Metal Oxide Semiconductor working principle, we need to discuss in brief about CMOS logic gates as explained below.

CMOS inverter:

The inverter circuit as shown in the figure below. It consists of PMOS and NMOS FET. The input A serves as the gate voltage for both transistors.



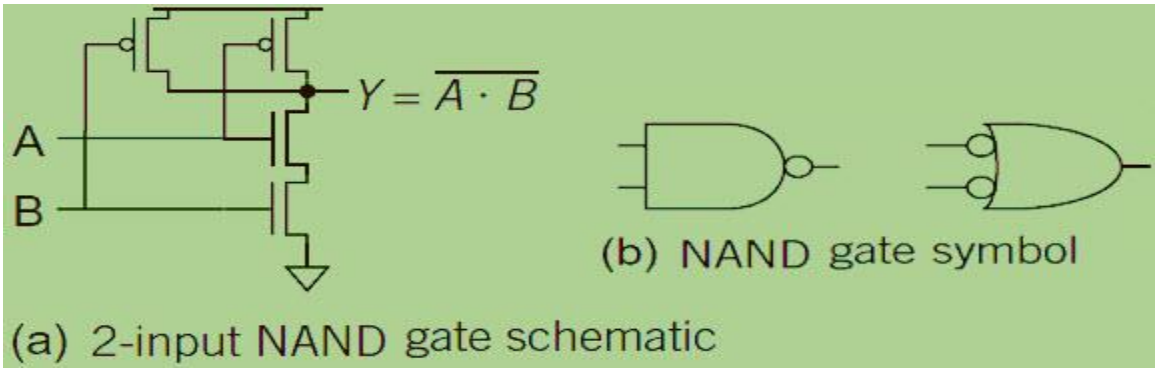
CMOS Inverter

The NMOS transistor has an input from Vss (ground) and PMOS transistor has an input from Vdd. The terminal Y is output. When a high voltage (~ Vdd) is given at input terminal (A) of the inverter, the PMOS becomes open circuit and NMOS switched OFF so the output will be pulled down to Vss.

When a low-level voltage (<Vdd, ~0v) applied to the inverter, the NMOS switched OFF and PMOS switched ON. So the output becomes Vdd or the circuit is pulled up to Vdd.

CMOS NAND gate:

The below figure shows a 2-input Complementary MOS NAND gate. It consists of two series NMOS transistors between Y and Ground and two parallel PMOS transistors between Y and VDD.

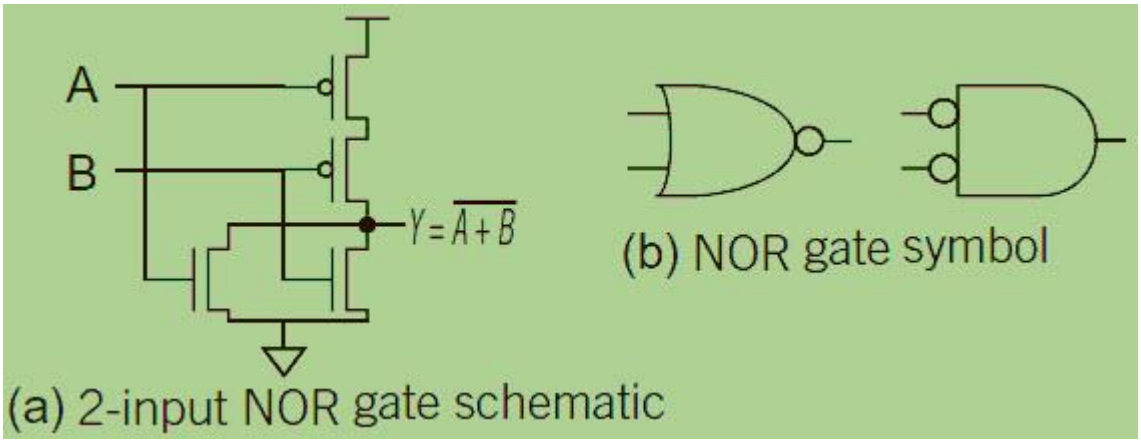


If either input A or B is logic 0, at least one of the NMOS transistors will be OFF, breaking the path from Y to Ground. But at least one of the pMOS transistors will be ON, creating a path from Y to VDD.

Hence, the output Y will be high. If both inputs are high, both of the nMOS transistors will be ON and both of the pMOS transistors will be OFF. Hence, the output will be logic low.

CMOS NOR gate:

A 2-input NOR gate is shown in the figure below. The NMOS transistors are in parallel to pull the output low when either input is high. The PMOS transistors are in series to pull the output high when both inputs are low, as given in below table. The output is never left floating.



CMOS Applications:

Complementary MOS processes were widely implemented and have fundamentally replaced NMOS and bipolar processes for nearly all digital logic applications. The CMOS technology has been used for the following digital IC designs.

- Computer memories, CPUs
- Microprocessor designs
- Flash memory chip designing
- Used to design application-specific integrated circuits (ASICs)

Date:	12th June 2020	Name:	Soundarya NA
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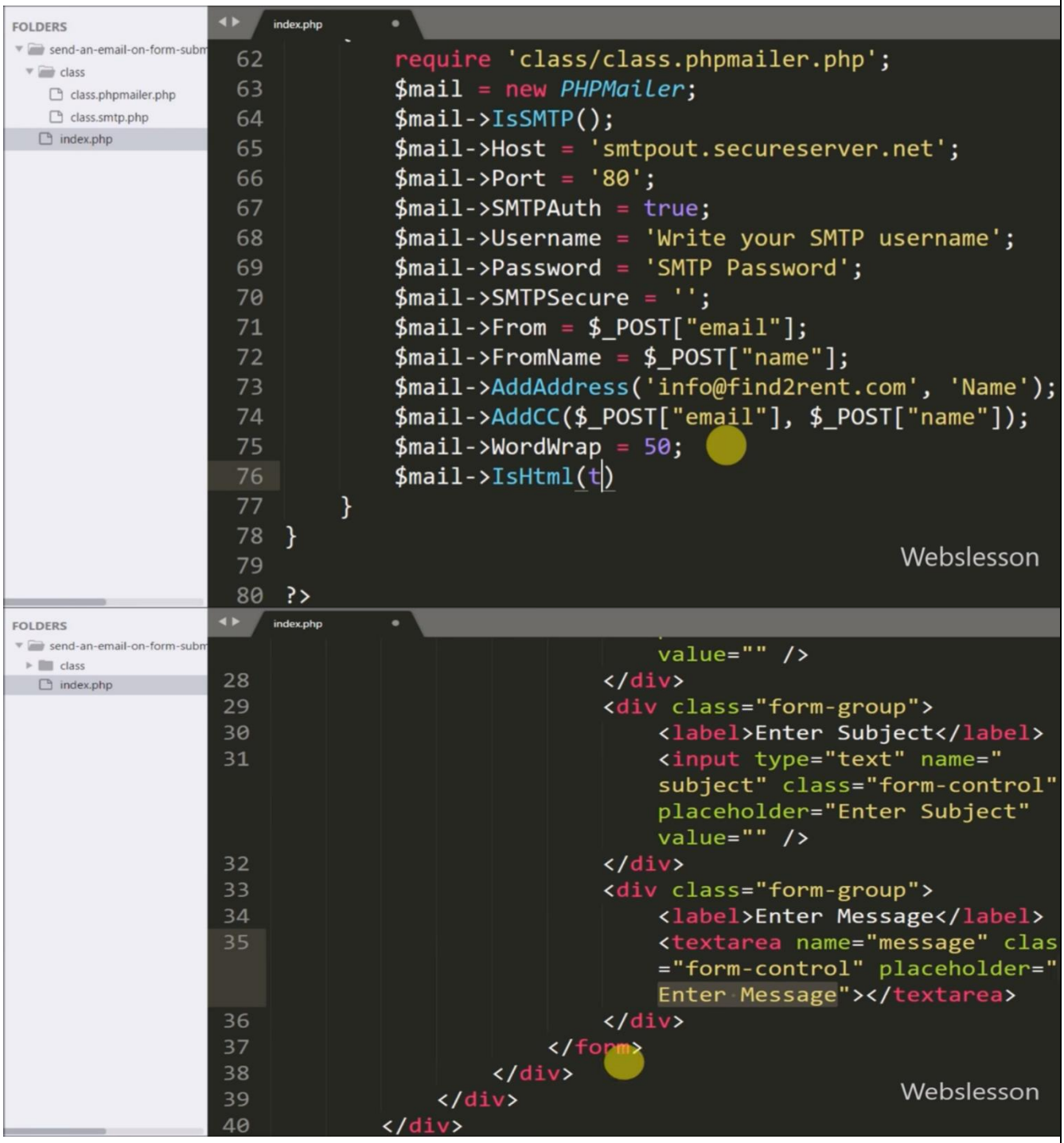
Image:



Report:
Email with PHP:
Send a simple email:

```
<?php
// the message
$msg = "First line of text\nSecond line of text";

// use wordwrap() if lines are longer than 70 characters
$msg = wordwrap($msg,70);

// send email
mail("someone@example.com","My subject",$msg);
?>
```

Send an email with extra headers:

```
<?php
$to = "somebody@example.com";
$subject = "My subject";
$txt = "Hello world!";
$headers = "From: webmaster@example.com" . "\r\n" .
"CC: somebodyelse@example.com";

mail($to,$subject,$txt,$headers);
?>
```

Send an HTML email:

```
<?php
$to = "somebody@example.com, somebodyelse@example.com";
$subject = "HTML email";

$message = "
```

```
<html>
<head>
<title>HTML email</title>
</head>
<body>
<p>This email contains HTML Tags!</p>
<table>
<tr>
<th>Firstname</th>
<th>Lastname</th>
</tr>
<tr>
<td>John</td>
<td>Doe</td>
</tr>
</table>
</body>
</html>
";

// Always set content-type when sending HTML email
$headers = "MIME-Version: 1.0" . "\r\n";
$headers .= "Content-type:text/html;charset=UTF-8" . "\r\n";

// More headers
$headers .= 'From: <webmaster@example.com>' . "\r\n";
$headers .= 'Cc: myboss@example.com' . "\r\n";

mail($to,$subject,$message,$headers);
?>
```

Real life PHP introduction:

PHP started out as a small open source project that evolved as more and more people found out how useful it was. Rasmus Lerdorf unleashed the first version of PHP way back in 1994.

- PHP is a recursive acronym for "PHP: Hypertext Preprocessor".
- PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites.
- It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.
- PHP is pleasingly zippy in its execution, especially when compiled as an Apache module on the Unix side. The MySQL server, once started, executes even very complex queries with huge result sets in record-setting time.
- PHP supports a large number of major protocols such as POP3, IMAP, and LDAP. PHP4 added support for Java and distributed object architectures (COM and CORBA), making n-tier development a possibility for the first time.
- PHP is forgiving: PHP language tries to be as forgiving as possible.
- PHP Syntax is C-Like.

Common uses of PHP:

- PHP performs system functions, i.e. from files on a system it can create, open, read, write, and close them.
- PHP can handle forms, i.e. gather data from files, save data to a file, through email you can send data, return data to the user.
- You add, delete, modify elements within your database through PHP.
- Access cookies variables and set cookies.
- Using PHP, you can restrict users to access some pages of your website.
- It can encrypt data.

Characteristics of PHP:

Five important characteristics make PHP's practical nature possible −

- Simplicity
- Efficiency
- Security
- Flexibility
- Familiarity

“HELLO WORLD” script in PHP:

```
<html>

  <head>
    <title>Hello World</title>
  </head>

  <body>
    <?php echo "Hello, World!";?>
  </body>

</html>
```

Output:

Hello, World!