

Laporan Akhir 2 Modul 2

[KEMBALI KE MENU SEBELUMNYA]

1. Foto Hardware dan diagram blok

2. Prosedur Percobaan

3. Rangkaian Simulasi dan Prinsip Kerja

4. Flowchart dan Listing program

5. Kondisi

6. Video Simulasi Praktikum

7. Analisa

8. Download File

Percobaan 4

Kontrol Motor Servo dengan PWM

1. Foto Hardware dan diagram Blok

Pendahuluan

a. Hardware

1. Motor Servo

2. Arduino Uno

3. Keypad

4. Jumper

5. Breadboard

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0.25em; padding: 0px;">Buat program di aplikasi arduino IDE<li style="margin: 0px 0px 0.25em; padding: 0px;">Setelah selesai masukkan program ke arduino <li style="margin: 0px 0px 0.25em; padding: 0px;">Jalankan program pada simulasi dan cobakan dengan modul<div>
</div><div><div>3 . Rangkaian Simulasi dan Prinsip Kerja [Kembali]</div><div><div class="separator" style="clear: both; text-align: center;">
</div><div>
</div><div>Prinsip Kerja : </div>
</div><div> Pada percobaan 2 ini terdiri dari beberapa komponen, seperti breadboard, keypad, arduino uno, jumper, Motor servo dan lainnya. Dimana pada rangkaian ini Keypad bertindak sebagai input yang nantinya akan terhubung nantinya ke arduino Uno, dan motor servo bertindak sebagai penampil output yang diberikan. </div><div> Pada percobaan ini , menerapkan PWM pada arduino uno. Pada saat keypad ditekan, input akan disalurkan ke arduino uno ,sehingga nantinya arduino uno akan menghasilkan output untuk mengendalikan motor servo.Arduino uno akan mengirimkan sinyal PWM , dimana sinyal PWM ini akan menentukan sudut putaran motor servo. Sudut pada motor servo dapat dikondisikan dengan kodingan dengan memberikan input pada keypad seperti :</div><div><ul data-sourcepos="11:1-19:21" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; color: #1f1f1f; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; font-family: "Google Sans", "Helvetica Neue", sans-serif; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-size: 16px; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 4px 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px 0px 0px 18px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; text-align: justify; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;"><li data-sourcepos="11:1-11:21" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 1: 0 derajat<li data-sourcepos="12:1-12:22"

style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 2: 45 derajat<li data-sourcepos="13:1-13:22" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 3: 90 derajat<li data-sourcepos="14:1-14:23" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 4: 135 derajat<li data-sourcepos="15:1-15:23" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal;

font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 5: 180 derajat<li data-sourcepos="16:1-16:23" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 6: 135 derajat<li data-sourcepos="17:1-17:22" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 7: 90 derajat<li data-sourcepos="18:1-18:22" style="animation: 0s ease 0s 1 normal none running none; appearance: none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 8: 45 derajat<li data-sourcepos="19:1-19:21" style="animation: 0s ease 0s 1 normal none running none; appearance:

none; background-attachment: scroll; background-clip: border-box; background-image: none; background-origin: padding-box; background-position: 0% 0%; background-repeat: repeat; background-size: auto; border: 0px none rgb(31, 31, 31); clear: none; clip: auto; columns: auto; contain: none; container: none; content: normal; cursor: auto; cx: 0px; cy: 0px; d: none; direction: ltr; fill: rgb(0, 0, 0); filter: none; flex: 0 1 auto; float: none; font-feature-settings: normal; font-kerning: auto; font-optical-sizing: auto; font-stretch: normal; font-variant-alternates: normal; font-variant-east-asian: normal; font-variant-numeric: normal; font-variant-position: normal; font-variation-settings: normal; gap: normal; hyphens: manual; inset: auto; isolation: auto; line-height: 28px; margin: 0px; marker: none; mask: none; offset: normal; opacity: 1; order: 0; outline: rgb(31, 31, 31) none 0px; overlay: none; padding: 0px; page: auto; perspective: none; position: static; quotes: auto; r: 0px; resize: none; rotate: none; rx: auto; ry: auto; scale: none; speak: normal; stroke: none; transform: none; transition: all 0s ease 0s; translate: none; visibility: visible; x: 0px; y: 0px; zoom: 1;">Tombol 9: 0 derajat</div><div> Hasil output nantinya berupa putaran pada motor servo yang sebelumnya diberikan input pada keypad. Dimana sudut putaran motor servo akan bergantung pada tombol yang ditekan pada keypad. </div><div> </div></div><div> </div><div class="separator" style="clear: both; text-align: center;">
</div><div>4. Flowchart [Kembali]</div><div>
</div><div><b style="background-color: white; color: #434f54; font-size: 14px; white-space: pre;">a. Flowchart</div><div><div class="separator" style="clear: both; text-align: center;"></div>
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<b style="background-color: white; color: #434f54; font-size: 14px; white-space: pre;">
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</div><div>b. Listing Program </div><div>
</div><div><div style="background-color: white; color: #4e5b61; font-family: Consolas, "Courier New"; monospace; font-size: 14px; line-height: 19px; white-space: pre;"><div style="line-height: 19px;"><div>>#include <Servo.h></div><div>>#include <Keypad.h></div><div>Servo servoMotor;</div><div><span style="color:

```
#00979d;">const</span><span style="color: #00979d;">int</span> servoPin = <span style="color: #00979d;">11</span></span>;<span style="color: #95a5a6;"> // PWM pin for servo</span></div><div><span style="color: #00979d;">const</span><span style="color: #00979d;">int</span> numRows = <span style="color: #005c5f;">4</span></span>;<span style="color: #95a5a6;"> // Number of rows in keypad</span></div><div><span style="color: #00979d;">const</span><span style="color: #00979d;">int</span> numCols = <span style="color: #005c5f;">3</span></span>;<span style="color: #95a5a6;"> // Number of columns in keypad</span></div><div><span style="color: #00979d;">char</span><span style="color: #d35400;">keys</span>[numRows][numCols] = <span style="color: #434f54;">{</span></span></div><div>&nbsp;<span style="color: #434f54;">{'1', '2', '3'</span></span></div><div>&nbsp;<span style="color: #434f54;">{'4', '5', '6'</span></span></div><div>&nbsp;<span style="color: #434f54;">{'7', '8', '9'</span></span></div><div>&nbsp;<span style="color: #434f54;">{'*', '0', '#'</span></span></div><div><span style="color: #434f54;">}</span></div><div>byte <span style="color: #d35400;">rowPins</span>[numRows] = <span style="color: #434f54;">{</span></span><span style="color: #005c5f;">9</span></span>, <span style="color: #005c5f;">8</span></span>, <span style="color: #005c5f;">7</span></span>, <span style="color: #005c5f;">6</span></span><span style="color: #434f54;">}</span></div><div>byte <span style="color: #d35400;">colPins</span>[numCols] = <span style="color: #434f54;">{</span></span><span style="color: #005c5f;">5</span></span>, <span style="color: #005c5f;">4</span></span>, <span style="color: #005c5f;">3</span></span><span style="color: #434f54;">}</span></div><div><span style="color: #95a5a6;"> // Columns 0 to 2</span></div><div>Keypad keypad = <span style="color: #d35400;">Keypad</span><span style="color: #434f54;">(</span></span><span style="color: #d35400;">makeKeymap</span><span style="color: #434f54;">(</span></span><span style="color: #434f54;">keys</span><span style="color: #434f54;">,</span></span> rowPins, colPins, numRows, numCols<span style="color: #434f54;">)</span></div><div><span style="color: #00979d;">void</span><span style="color: #d35400;">setup</span><span style="color: #434f54;">()</span></div><div>&nbsp;<span style="color: #d35400;">servoMotor</span>.<span style="color: #d35400;">attach</span><span style="color: #434f54;">(servoPin</span><span style="color: #434f54;">)</span></div><div>&nbsp;<span style="color: #d35400;">servoMotor</span>.<span style="color: #d35400;">write</span><span style="color: #434f54;">(90</span></span><span style="color: #434f54;">)</span></div><div><span style="color: #95a5a6;"> // Initial position</span></div><div>&nbsp;<span style="color: #d35400;">Serial</span>.<span style="color: #d35400;">begin</span><span style="color: #434f54;">(9600</span><span style="color: #434f54;">)</span></div><div><span style="color: #434f54;">}</span></div><div><span style="color: #00979d;">void</span><span style="color: #d35400;">loop</span><span style="color: #434f54;">()</span></div><div>&nbsp;<span style="color: #00979d;">char</span> key = <span style="color: #d35400;">keypad</span>.<span style="color: #d35400;">getKey</span><span style="color: #434f54;">()</span></div><div>&nbsp;</div><div>&nbsp;<span style="color: #728e00;">if</span><span style="color: #434f54;">(key != NO_KEY</span><span style="color: #434f54;">)</span></div><div>&nbsp;<span style="color: #d35400;">Serial</span>.<span style="color: #d35400;">println</span><span style="color: #434f54;">(key</span><span style="color: #434f54;">)</span></div><div>&nbsp;</div><div>&nbsp;<span style="color: #728e00;">switch</span><span style="color: #434f54;">(key</span><span style="color: #434f54;">)</span></div>
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#434f54;"></div><div> </div><div></div></div></div><div>
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</div><div>5. Video Simulasi
Praktikum [Kembali]</div><div>
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<div>6. Analisa [Kembali]</div><div>
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