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<a name="home">
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<br />
<div style="text-align: center;">
<a href="https://chalisa212043.blogspot.com/p/modul-4.html">[KEMBALI KE MENU
SEBELUMNYA]</a></div>
<br />
<center>
<div style="background-color: white; border: 2px dashed rgb(23, 128, 221); height: 240px; overflow:
auto; padding: 10px; text-align: center; width: 330px;">
<b>DAFTAR ISI</b>
<br />
<div style="text-align: left;">
<a href="#Prosedur">1. Prosedur</a></div>
<div style="text-align: left;">
<a href="#Hardware">2. Hardware dan Diagram Blok</a></div>
<div style="text-align: left;">
<a href="#Rangkaian">3. Rangkaian Simulasi dan Prinsip Kerja</a></div>
<div style="text-align: left;">
<a href="#Flowchart">4. Flowchart dan Listing Program</a></div>
<div style="text-align: left;">
<a href="#Kondisi">5. Kondisi</a></div>
<div style="text-align: left;">
<a href="#Simulasi">6. Video Simulasi</a></div>
<div style="text-align: left;">
<a href="#Download">7. Download File</a><br />
</div><div style="text-align: left;"><br /></div>
</div>
</center>
<span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><span
style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif; font-size:
small;"><b><div><br /></div><div><span style="font-family: &quot;times&quot; , &quot;times new
roman&quot; , serif;"><span style="font-family: &quot;times&quot; , &quot;times new roman&quot;
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, serif; font-size: small;"/>**
</div><div>
</div>1. Prosedur **

[Kembali]</div><div>
</div><div><b style="background-color: white;"><div style="border: 0px; box-sizing: border-box; color: #444444; font-weight: 400; margin: 0px; padding: 0px;">1. Rangkai semua komponen</div><div style="border: 0px; box-sizing: border-box; color: #444444; font-weight: 400; margin: 0px; padding: 0px;">2. Buat program di aplikasi arduino IDE</div><div style="border: 0px; box-sizing: border-box; color: #444444; font-weight: 400; margin: 0px; padding: 0px;">3. Setelah selesai masukkan program ke arduino </div><div style="border: 0px; box-sizing: border-box; color: #444444; font-weight: 400; margin: 0px; padding: 0px;">4. Jalankan program pada simulasi dan cobakan dengan modul</div><div style="font-weight: 400; text-align: justify;"><div style="text-align: left;">5. Selesai</div><div style="font-family: Georgia, Utopia, "Palatino Linotype", Palatino, serif; font-size: 15.4px; text-align: left;">
</div></div></div></div></div></div>

2. Hardware dan Diagram Blok

[Kembali]</div><div>
</div><div>Hardware :</div><div>Arduino Uno</div><div>
</div><div><div class="separator" style="clear: both; text-align: center;"><div class="separator" style="clear: both; text-align: center;"></div></div><div class="separator" style="clear: both; text-align: center;">
</div></div><div>
</div><div>
</div><div class="separator" style="clear: both; text-align: center;"><div style="background-color: white; color: #4e4e4e; font-family: Arial, Tahoma, Helvetica, FreeSans, sans-serif; font-size: 13.2px; text-align: start;"><span style="font-family: times,


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font-family: times; font-size: 15.4px; margin-left: 1em; margin-right: 1em;"></a></div><br /><span style="font-family: times, times new roman, serif;"><br /></span>

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3. Rangkaian Simulasi dan Prinsip Kerja


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<a href="#home">[Kembali]</a></span></span></div><div><span style="font-family: times, times
new roman, serif;"><br /></span></div><div><span style="font-family: times, times new roman,
serif;">Rangkaian Simulasi :</span></div><div><span style="font-family: times, times new roman,
serif;"><br /></span></div><div><div class="separator" style="clear: both; text-align: center;"><br
/></div>&nbsp; &nbsp; &nbsp; &nbsp; &nbsp;<span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</span>&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;</div><div class="separator" style="clear: both; text-align: center;"><a
href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEiz4YgV76r6xrGMSkZzHgodobK
9u15-hRRfKQKanJLZ6gRaC8hvHNkbHAsnjvbYw6UBCRan34LJ57E1Ake7sFNI1A_1H5tx6jrG2Wm2OnRfU
dAdriXcOSh8aaO1YtSffcFyglCMkPfljOoDOW6ANZILz_jjhSntlJvlRktcQHUpTyHWr5jqTmTbIQHYwRV/
s1280/1.jpg" style="margin-left: 1em; margin-right: 1em;"></a></div><br /></span><br /><span style="font-family: times, times new
roman, serif;"><br /></span></div><div><span style="font-family: times, times new roman,
serif;">Prinsip Kerja :</span></div><div><span style="font-family: times, times new roman,
serif;"><br /></span></div><div><div class="separator" style="background-color: white; clear: both;
color: #3d3d3d; font-family: times; font-size: 15.4px; text-align: justify;"><ul style="color: #222222;
font-family: Georgia, Utopia, &quot;Palatino Linotype&quot;, Palatino, serif; line-height: 1.4; margin:
0.5em 0px; padding: 0px 2.5em; text-align: left;"><div><p style="--tw-border-spacing-x: 0;
--tw-border-spacing-y: 0; --tw-ring-color: rgba(69,89,164,.5); --tw-ring-offset-color: #fff;
--tw-ring-offset-shadow: 0 0 transparent; --tw-ring-offset-width: 0px; --tw-ring-shadow: 0 0
transparent; --tw-rotate: 0; --tw-scale-x: 1; --tw-scale-y: 1; --tw-scroll-snap-strictness: proximity;
--tw-shadow-colored: 0 0 transparent; --tw-shadow: 0 0 transparent; --tw-skew-x: 0; --tw-skew-y: 0;
--tw-translate-x: 0; --tw-translate-y: 0; border: 0px solid rgb(227, 227, 227); box-sizing: border-box;
margin: 0px 0px 1.25em; text-align: justify;"><span style="color: #0d0d0d; font-family:
Times;"><span style="white-space-collapse: preserve;">Pada praktikum menggunakan dua Arduino
Uno, dengan satu Arduino bertindak sebagai master dan Arduino lainnya bertindak sebagai

```

penerima. Master Arduino terhubung ke bagian input, yaitu saklar DIP. Sedangkan slave Arduino dihubungkan dengan output 7 segmen 2 digit. Master Arduino bertindak sebagai Arduino yang meneruskan perintah ke slave Arduino melalui input. Di sisi lain, slave Arduino bertindak sebagai penerima dan menjalankan perintah dalam bentuk keluaran.

Pada rangkaian ini kedua Arduino berkomunikasi satu sama lain menggunakan sistem SPI, dengan pin 10-13 dari master Arduino dihubungkan ke pin 10-13 dari Arduino slave. Jika 2 saklar pada saklar DIP aktif, keluarannya berupa angka pada digit ke 1 dalam tujuh segmen 2 digit. Jika saklar DIP mempunyai tiga saklar aktif, maka 7 segmen akan menampilkan angka 3 pada ke 2 digit (kedua digit 7 segmen aktif).

4. Flowchart dan Listing Program

[Flowchart](#)

[Kembali](#)

Flowchart :

Master

Slave



Slave

Master

href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEi1YDFI-RvpdCZI_7bwk_BrP6eEHFDfe1kWgJcNwaj6btBp02yHQW2XGtTNAEY_FvSYHMOIFptAyxJF_ng6TwjyxVUUM9eAGVnuEymEf0_YerMejnbvhe4dTjzAhmhaG8rZBbuf2uBq7xWYtoUy_KZRvoVNs-l9ejnkyuqiS0oHw1lqaEqV2bLaEtH3Oe5D/s625/Screenshot%202024-04-29%20120655.png" style="background-color: white; color: #ff33aa; font-family: times; font-weight: 400; margin-left: 1em; margin-right: 1em;"/>

Listing Program :

Master

```
#include <SPI.h>
int dip[] = {2, 3, 4, 5, 6, 7, 8, 9};
int dipvalue[] = {};
int dipCount = 0;
void setup() {
  Serial.begin(9600);
  for (int i = 0; i < 8; i++) {
    pinMode(dip[i], INPUT_PULLUP);
    SPI.begin();
    SPI.setClockDivider(SPI_CLOCK_DIV8);
    digitalWrite(SS, HIGH);
  }
  void loop() {
    byte Mastersend = 0;
    for (int i = 0; i < 8; i++) {
      dipvalue[i] = digitalRead(dip[i]);
      if (dipvalue[i] == LOW) {
        dipCount++;
      }
      if (dipCount % 2 == 0) {
        Mastersend = dipCount / 2;
        // Membagi jumlah dip switch yang aktif menjadi 2
      } else if (dipCount % 3 == 0) {
        Mastersend = dipCount / 3;
        // Membagi jumlah dip switch yang aktif menjadi 3
      }
      dipCount = 0;
      digitalWrite(SS, LOW);
      SPI.transfer(Mastersend);
      delay(100);
    }
  }
}

```

Slave

```
#include <SPI.h>

```

```
#define a 9
#define b 8
style="background-color: white; color: #4e4e4e; font-family: times, times new roman, serif; font-size: 13.2px;"
#define c 7
#define d 6
style="background-color: white; color: #4e4e4e; font-family: times, times new roman, serif; font-size: 13.2px;"
#define e 5

```

```

font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">#define f 4</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">#define g 3</div><div style="background-color: white; color: #4e4e4e;
font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">#define dp 2</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">#define D1 A1</div><div style="background-color: white; color: #4e4e4e;
font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">#define D2 A3</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;"><br /></div><div style="background-color: white; color: #4e4e4e;
font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">const int segmentPins[]
= {a, b, c, d, e, f, g};</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;; serif; font-size: 13.2px;"><br /></div><div style="background-color:
white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;; serif; font-size:
13.2px;">volatile boolean received = false;</div><div style="background-color: white; color:
#4e4e4e; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">volatile byte
Slavereceived;</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;; serif; font-size: 13.2px;"><br /></div><div style="background-color:
white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;; serif; font-size:
13.2px;">void setup() {</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;; serif; font-size: 13.2px;">&nbsp; pinMode(D1, OUTPUT);</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">&nbsp; pinMode(D2, OUTPUT);</div><div style="background-color: white;
color: #4e4e4e; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">&nbsp;
Serial.begin(9600);</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;; serif; font-size: 13.2px;">&nbsp; for (int i = 0; i &lt; 7; i++)
{</div><div style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new
roman&quot;; serif; font-size: 13.2px;">&nbsp; &nbsp; pinMode(segmentPins[i],
OUTPUT);</div><div style="background-color: white; color: #4e4e4e; font-family: times, &quot;times
new roman&quot;; serif; font-size: 13.2px;">&nbsp; }</div><div style="background-color: white;
color: #4e4e4e; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">&nbsp;
SPCR |= _BV(SPE);</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;; serif; font-size: 13.2px;">&nbsp; SPI.attachInterrupt();</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">}</div><div style="background-color: white; color: #4e4e4e; font-family:
times, &quot;times new roman&quot;; serif; font-size: 13.2px;"><br /></div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">ISR(SPI_STC_vect) {</div><div style="background-color: white; color:
#4e4e4e; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px;">&nbsp;
Slavereceived = SPDR;</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;; serif; font-size: 13.2px;">&nbsp; received = true;</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">}</div><div style="background-color: white; color: #4e4e4e; font-family:
times, &quot;times new roman&quot;; serif; font-size: 13.2px;"><br /></div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">void displayCharacter(int digit, int digitPosition) {</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;;
serif; font-size: 13.2px;">&nbsp; byte patterns[10][7] = {</div><div style="background-color: white;
color: #4e4e4e; font-family: times, &quot;times new roman&quot;; serif; font-size:

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white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;, serif; font-size:
13.2px;">void loop() {</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; if (received) {</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; if (Slavereceived == 1) {</div><div style="background-color:
white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;, serif; font-size:
13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; displayCharacter(8, D1);</div><div style="background-color: white;
color: #4e4e4e; font-family: times, &quot;times new roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp;
&nbsp; &nbsp; displayCharacter(0, D2);</div><div style="background-color: white; color: #4e4e4e;
font-family: times, &quot;times new roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; } else if
(Slavereceived == 2) { // Menampilkan angka 2 jika diterima dari master</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; displayCharacter(2, D1);</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; displayCharacter(0, D2);</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; } else if (Slavereceived == 3) { // Menampilkan angka 3 jika
diterima dari master</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; displayCharacter(0,
D1);</div><div style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new
roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; displayCharacter(3, D2);</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; } else if (Slavereceived == 4) {</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; displayCharacter(4, D1);</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; displayCharacter(4, D2);</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; &nbsp; }</div><div style="background-color: white; color: #4e4e4e;
font-family: times, &quot;times new roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp;
delay(100);</div><div style="background-color: white; color: #4e4e4e; font-family: times,
&quot;times new roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; received = false;</div><div
style="background-color: white; color: #4e4e4e; font-family: times, &quot;times new roman&quot;,
serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; }</div><div style="background-color: white; color: #4e4e4e;
font-family: times, &quot;times new roman&quot;, serif; font-size: 13.2px;">&nbsp; &nbsp; &nbsp; }</div><div
style="background-color: white; color: #222222; font-family: times; font-size: 15.4px; text-align:
justify;"><div style="text-align: left;"><div style="font-family: Consolas, &quot;Courier New&quot;,
monospace; font-size: 14px; line-height: 19px; white-space: pre;"><div style="border: 0px; box-sizing:
border-box; font-family: &quot;open sans&quot;, arial, helvetica, sans-serif; font-size: 15px; margin:
0px; padding: 0px; white-space: normal;"><div style="font-family: times;"><div style="font-family:
Consolas, &quot;Courier New&quot;, monospace; font-size: 14px; white-space: pre;"><pre
style="font-size: 15.4px;"><div><div style="color: black; font-family: &quot;Trebuchet MS&quot;,
Trebuchet, Verdana, sans-serif; font-size: 13.2px; text-align: center; white-space: normal;"><center
style="border: 0px; box-sizing: border-box; margin: 0px; padding: 0px;"><div style="border: 0px;
box-sizing: border-box; margin: 0px; padding: 0px;"><span style="border: 0px; box-sizing: border-box;
margin: 0px; padding: 0px; text-align: left;"><span style="font-family: times; font-size: medium;"><div
style="border: 0px; box-sizing: border-box; margin: 0px; padding: 0px;"><span style="border: 0px;
box-sizing: border-box; margin: 0px; padding: 0px;"><span style="border: 0px; box-sizing: border-box;

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