

Programação Reativa para Educação

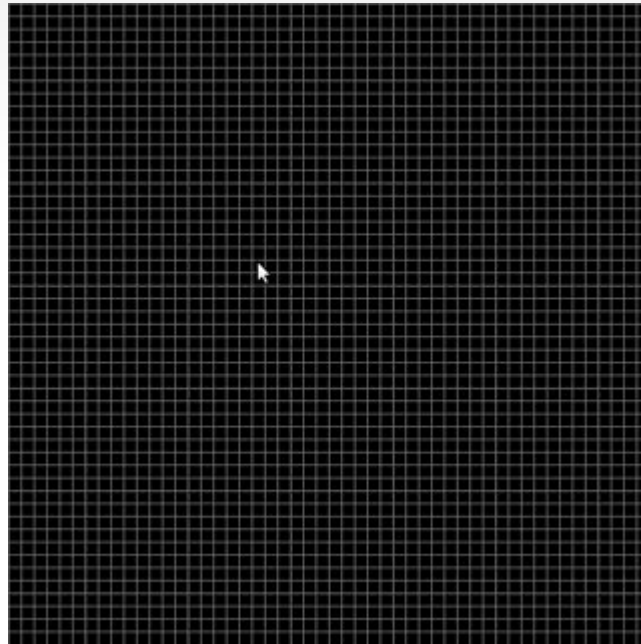
Francisco Sant'Anna

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`http://github.com/fsantanna-no/101`

Exercício 1.1

- Desenhar um **X** na tela:



Exercício 1.1

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```
var integer p = 0;
loop do
  emit GRAPHICS_DRAW_PIXEL(p,p);
  emit GRAPHICS_DRAW_PIXEL(49-p,p);
  await 100ms;
  p = p + 1;
  if p == 50 then
    break;
  end
end
```

Exercício 1.1

```
var integer p = 0;
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    p = p + 1;
    if p == 50 then
        break;
    end
end
```

```
par do
    var integer p1 = 0;
    loop do
        emit GRAPHICS_DRAW_PIXEL(p1,p1);
        await 100ms;
        p1 = p1 + 1;
        if p1 == 50 then
            break;
        end
    end
with
    var integer p2 = 0;
    loop do
        emit GRAPHICS_DRAW_PIXEL(49-p2,p2);
        await 100ms;
        p2 = p2 + 1;
        if p2 == 50 then
            break;
        end
    end
end
```

Exercício 1.1

```
var integer p = 0;
loop do
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```

```
par do
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    emit GRAPHICS_DRAW_PIXEL(p1,p1);
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    p1 = p1 + 1;
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    end
  end
end
with
  var integer p2 = 0;
  loop do
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par do
  var integer p1 = 0;
  loop do
    emit GRAPHICS_DRAW_PIXEL(p1,p1);
    await 100ms;
    p1 = p1 + 1;
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  var integer p2 = 0;
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    await 100ms;
    p2 = p2 + 1;
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  end
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end
```


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  await 100ms;  
  p = p + 1;  
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```

```
par do  
  var integer p1 = 0;  
  loop do  
    emit GRAPHICS_DRAW_PIXEL(p1,p1);  
    await 100ms;  
    p1 = p1 + 1;  
    if p1 == 50 then  
      break;  
    end  
  end  
with  
  var integer p2 = 0;  
  loop do  
    emit GRAPHICS_DRAW_PIXEL(49-p2,p2);  
    await 100ms;  
    p2 = p2 + 1;  
    if p2 == 50 then  
      break;  
    end  
  end  
end  
end
```

Exercício 1.1

```
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par do

```
var integer p1 = 0;
loop do
  emit GRAPHICS_DRAW_PIXEL(p1,p1);
  await 100ms;
  p1 = p1 + 1;
  if p1 == 50 then
    break;
  end
end
```

with

```
var integer p2 = 0;
loop do
  emit GRAPHICS_DRAW_PIXEL(49-p2,p2);
  await 100ms;
  p2 = p2 + 1;
  if p2 == 50 then
    break;
  end
end
end
```

Exercício 1.1

```
var integer p = 0;
loop do
  emit GRAPHICS_DRAW_PIXEL(p,p);
emit GRAPHICS_DRAW_PIXEL(49-p,p);
  await 100ms;
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```

par do

```
var integer p1 = 0;
loop do
  emit GRAPHICS_DRAW_PIXEL(p1,p1);
  await 100ms;
  p1 = p1 + 1;
  if p1 == 50 then
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with

```
var integer p2 = 0;
loop do
  emit GRAPHICS_DRAW_PIXEL(49-p2,p2);
  await 100ms;
  p2 = p2 + 1;
  if p2 == 50 then
    break;
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Exercício 1.1

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  p = p + 1;  
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  end  
end
```

par do

```
var integer p1 = 0;  
loop do  
  emit GRAPHICS_DRAW_PIXEL(p1,p1);  
  await 100ms;  
  p1 = p1 + 1;  
  if p1 == 50 then  
    break;  
  end  
end
```

with

```
var integer p2 = 0;  
loop do  
  emit GRAPHICS_DRAW_PIXEL(49-p2,p2);  
  await 100ms;  
  p2 = p2 + 1;  
  if p2 == 50 then  
    break;  
  end  
end
```

end

Exercício 2.2

- Movimentar dois pixels ao mesmo tempo
- Usar conjunto de teclas diferentes
 - como se fossem dois jogadores
- <https://fsantanna.github.io/pico-ceu/out/manual/v0.30/input/>

Exercício 3.1

- Resolver Exercício 1.1 usando par

```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);
var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);
loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
    if key == KEY_LEFT then
        x1 = x1 - 1;
    else/if key == KEY_RIGHT then
        x1 = x1 + 1;
    else/if key == KEY_UP then
        y1 = y1 - 1;
    else/if key == KEY_DOWN then
        y1 = y1 + 1;
    end
    if key == KEY_a then
        x2 = x2 - 1;
    else/if key == KEY_d then
        x2 = x2 + 1;
    else/if key == KEY_w then
        y2 = y2 - 1;
    else/if key == KEY_s then
        y2 = y2 + 1;
    end
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
end

```

```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);
var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);
loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
    if key == KEY_LEFT then
        x1 = x1 - 1;
    else/if key == KEY_RIGHT then
        x1 = x1 + 1;
    else/if key == KEY_UP then
        y1 = y1 - 1;
    else/if key == KEY_DOWN then
        y1 = y1 + 1;
    end
    if key == KEY_a then
        x2 = x2 - 1;
    else/if key == KEY_d then
        x2 = x2 + 1;
    else/if key == KEY_w then
        y2 = y2 - 1;
    else/if key == KEY_s then
        y2 = y2 + 1;
    end
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
end

```



```
var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);

var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);
loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
    if key == KEY_LEFT then
        x1 = x1 - 1;
    else/if key == KEY_RIGHT then
        x1 = x1 + 1;
    else/if key == KEY_UP then
        y1 = y1 - 1;
    else/if key == KEY_DOWN then
        y1 = y1 + 1;
    end
    if key == KEY_a then
        x2 = x2 - 1;
    else/if key == KEY_d then
        x2 = x2 + 1;
    else/if key == KEY_w then
        y2 = y2 - 1;
    else/if key == KEY_s then
        y2 = y2 + 1;
    end
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
end
```

```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);

var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);
loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
    if key == KEY_LEFT then
        x1 = x1 - 1;
    else/if key == KEY_RIGHT then
        x1 = x1 + 1;
    else/if key == KEY_UP then
        y1 = y1 - 1;
    else/if key == KEY_DOWN then
        y1 = y1 + 1;
    end
    if key == KEY_a then
        x2 = x2 - 1;
    else/if key == KEY_d then
        x2 = x2 + 1;
    else/if key == KEY_w then
        y2 = y2 - 1;
    else/if key == KEY_s then
        y2 = y2 + 1;
    end
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
end

```

```
var integer x1 = 25;  
var integer y1 = 25;  
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
emit GRAPHICS_DRAW_PIXEL(x1,y1);
```

```
var integer x2 = 24;  
var integer y2 = 24;  
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
loop do  
    var integer key = await KEY_PRESS;  
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
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```
    if key == KEY_LEFT then  
        x1 = x1 - 1;  
    else/if key == KEY_RIGHT then  
        x1 = x1 + 1;  
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        y1 = y1 - 1;  
    else/if key == KEY_DOWN then  
        y1 = y1 + 1;  
    end
```

```
    if key == KEY_a then  
        x2 = x2 - 1;  
    else/if key == KEY_d then  
        x2 = x2 + 1;  
    else/if key == KEY_w then  
        y2 = y2 - 1;  
    else/if key == KEY_s then  
        y2 = y2 + 1;  
    end  
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
end
```

```
var integer x1 = 25;  
var integer y1 = 25;  
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
emit GRAPHICS_DRAW_PIXEL(x1,y1);
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var integer x2 = 24;  
var integer y2 = 24;  
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
emit GRAPHICS_DRAW_PIXEL(x2,y2);
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loop do  
    var integer key = await KEY_PRESS;  
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    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
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    if key == KEY_LEFT then  
        x1 = x1 - 1;  
    else/if key == KEY_RIGHT then  
        x1 = x1 + 1;  
    else/if key == KEY_UP then  
        y1 = y1 - 1;  
    else/if key == KEY_DOWN then  
        y1 = y1 + 1;  
    end
```

```
    if key == KEY_a then  
        x2 = x2 - 1;  
    else/if key == KEY_d then  
        x2 = x2 + 1;  
    else/if key == KEY_w then  
        y2 = y2 - 1;  
    else/if key == KEY_s then  
        y2 = y2 + 1;  
    end
```

```
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
end
```

```
var integer x1 = 25;  
var integer y1 = 25;  
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
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var integer x2 = 24;  
var integer y2 = 24;  
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emit GRAPHICS_DRAW_PIXEL(x2,y2);
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loop do  
    var integer key = await KEY_PRESS;  
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    if key == KEY_LEFT then  
        x1 = x1 - 1;  
    else/if key == KEY_RIGHT then  
        x1 = x1 + 1;  
    else/if key == KEY_UP then  
        y1 = y1 - 1;  
    else/if key == KEY_DOWN then  
        y1 = y1 + 1;  
    end
```

```
    if key == KEY_a then  
        x2 = x2 - 1;  
    else/if key == KEY_d then  
        x2 = x2 + 1;  
    else/if key == KEY_w then  
        y2 = y2 - 1;  
    else/if key == KEY_s then  
        y2 = y2 + 1;  
    end
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```
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
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    emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
end
```

```
par do  
    var integer x1 = 25;  
    var integer y1 = 25;  
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
    loop do  
        var integer key = await KEY_PRESS;  
        emit GRAPHICS_SET_RGB(0x00,0x00,0x00);  
        emit GRAPHICS_DRAW_PIXEL(x1,y1);  
        if key == KEY_LEFT then  
            x1 = x1 - 1;  
        else/if <...> then  
            <...>  
        end  
        emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
        emit GRAPHICS_DRAW_PIXEL(x1,y1);  
    end  
with  
    var integer x2 = 24;  
    var integer y2 = 24;  
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x2,y2);  
    loop do  
        var integer key = await KEY_PRESS;  
        emit GRAPHICS_SET_RGB(0x00,0x00,0x00);  
        emit GRAPHICS_DRAW_PIXEL(x2,y2);  
        if key == KEY_a then  
            x2 = x2 - 1;  
        else/if <...> then  
            <...>  
        end  
        emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
        emit GRAPHICS_DRAW_PIXEL(x2,y2);  
    end  
end
```

```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);

```

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var integer x2 = 24;
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emit GRAPHICS_DRAW_PIXEL(x2,y2);

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```

loop do
  var integer key = await KEY_PRESS;
  emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

  if key == KEY_LEFT then
    x1 = x1 - 1;
  else/if key == KEY_RIGHT then
    x1 = x1 + 1;
  else/if key == KEY_UP then
    y1 = y1 - 1;
  else/if key == KEY_DOWN then
    y1 = y1 + 1;
  end

```

```

  if key == KEY_a then
    x2 = x2 - 1;
  else/if key == KEY_d then
    x2 = x2 + 1;
  else/if key == KEY_w then
    y2 = y2 - 1;
  else/if key == KEY_s then
    y2 = y2 + 1;
  end

```

```

  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

end

```

```

par do
  var integer x1 = 25;
  var integer y1 = 25;
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    if key == KEY_LEFT then
      x1 = x1 - 1;
    else/if <...> then
      <...>
    end
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
  end
with
  var integer x2 = 24;
  var integer y2 = 24;
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);
  loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
    if key == KEY_a then
      x2 = x2 - 1;
    else/if <...> then
      <...>
    end
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
  end
end
end

```

```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);

```

```

var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

loop do
  var integer key = await KEY_PRESS;
  emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

  if key == KEY_LEFT then
    x1 = x1 - 1;
  else/if key == KEY_RIGHT then
    x1 = x1 + 1;
  else/if key == KEY_UP then
    y1 = y1 - 1;
  else/if key == KEY_DOWN then
    y1 = y1 + 1;
  end

```

```

  if key == KEY_a then
    x2 = x2 - 1;
  else/if key == KEY_d then
    x2 = x2 + 1;
  else/if key == KEY_w then
    y2 = y2 - 1;
  else/if key == KEY_s then
    y2 = y2 + 1;
  end

```

```

  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

end

```

```

par do
  var integer x1 = 25;
  var integer y1 = 25;
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    if key == KEY_LEFT then
      x1 = x1 - 1;
    else/if <...> then
      <...>
    end
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
  end
with
  var integer x2 = 24;
  var integer y2 = 24;
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);
  loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
    if key == KEY_a then
      x2 = x2 - 1;
    else/if <...> then
      <...>
    end
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
  end
end
end

```

```
var integer x1 = 25;  
var integer y1 = 25;  
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
emit GRAPHICS_DRAW_PIXEL(x1,y1);
```

```
var integer x2 = 24;  
var integer y2 = 24;  
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
loop do  
  var integer key = await KEY_PRESS;  
  emit GRAPHICS_SET_RGB(0x00,0x00,0x00);  
  emit GRAPHICS_DRAW_PIXEL(x1,y1);  
  emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
  if key == KEY_LEFT then  
    x1 = x1 - 1;  
  else/if key == KEY_RIGHT then  
    x1 = x1 + 1;  
  else/if key == KEY_UP then  
    y1 = y1 - 1;  
  else/if key == KEY_DOWN then  
    y1 = y1 + 1;  
  end
```

```
  if key == KEY_a then  
    x2 = x2 - 1;  
  else/if key == KEY_d then  
    x2 = x2 + 1;  
  else/if key == KEY_w then  
    y2 = y2 - 1;  
  else/if key == KEY_s then  
    y2 = y2 + 1;  
  end
```

```
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
  emit GRAPHICS_DRAW_PIXEL(x1,y1);  
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
  emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
end
```

```
par do
```

```
  var integer x1 = 25;  
  var integer y1 = 25;  
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
  emit GRAPHICS_DRAW_PIXEL(x1,y1);  
  loop do  
    var integer key = await KEY_PRESS;  
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
    if key == KEY_LEFT then  
      x1 = x1 - 1;  
    else/if <...> then  
      <...>  
    end  
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
  end
```

```
with
```

```
  var integer x2 = 24;  
  var integer y2 = 24;  
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
  emit GRAPHICS_DRAW_PIXEL(x2,y2);  
  loop do  
    var integer key = await KEY_PRESS;  
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x2,y2);  
    if key == KEY_a then  
      x2 = x2 - 1;  
    else/if <...> then  
      <...>  
    end  
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
  end
```

```
end
```



```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);

```

```

var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

loop do
  var integer key = await KEY_PRESS;
  emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

  if key == KEY_LEFT then
    x1 = x1 - 1;
  else/if key == KEY_RIGHT then
    x1 = x1 + 1;
  else/if key == KEY_UP then
    y1 = y1 - 1;
  else/if key == KEY_DOWN then
    y1 = y1 + 1;
  end

```

```

  if key == KEY_a then
    x2 = x2 - 1;
  else/if key == KEY_d then
    x2 = x2 + 1;
  else/if key == KEY_w then
    y2 = y2 - 1;
  else/if key == KEY_s then
    y2 = y2 + 1;
  end

```

```

  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

end

```

```

par do

```

```

  var integer x1 = 25;
  var integer y1 = 25;
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
    if key == KEY_LEFT then
      x1 = x1 - 1;
    else/if <...> then
      <...>
    end
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x1,y1);
  end
end

```

```

with

```

```

  var integer x2 = 24;
  var integer y2 = 24;
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);
  loop do
    var integer key = await KEY_PRESS;
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
    if key == KEY_a then
      x2 = x2 - 1;
    else/if <...> then
      <...>
    end
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
    emit GRAPHICS_DRAW_PIXEL(x2,y2);
  end

```

```

end

```

```

end

```

```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);

```

```

var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

loop do
  var integer key = await KEY_PRESS;
  emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

  if key == KEY_LEFT then
    x1 = x1 - 1;
  else/if key == KEY_RIGHT then
    x1 = x1 + 1;
  else/if key == KEY_UP then
    y1 = y1 - 1;
  else/if key == KEY_DOWN then
    y1 = y1 + 1;
  end

```

```

  if key == KEY_a then
    x2 = x2 - 1;
  else/if key == KEY_d then
    x2 = x2 + 1;
  else/if key == KEY_w then
    y2 = y2 - 1;
  else/if key == KEY_s then
    y2 = y2 + 1;
  end

```

```

  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

```

end

```

par do

```

var integer x1 = 25;
var integer y1 = 25;
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
emit GRAPHICS_DRAW_PIXEL(x1,y1);
loop do
  var integer key = await KEY_PRESS;
  emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
  if key == KEY_LEFT then
    x1 = x1 - 1;
  else/if <...> then
    <...>
  end
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x1,y1);
end

```

with

```

var integer x2 = 24;
var integer y2 = 24;
emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
emit GRAPHICS_DRAW_PIXEL(x2,y2);
loop do
  var integer key = await KEY_PRESS;
  emit GRAPHICS_SET_RGB(0x00,0x00,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);
  if key == KEY_a then
    x2 = x2 - 1;
  else/if <...> then
    <...>
  end
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);
  emit GRAPHICS_DRAW_PIXEL(x2,y2);

```

end

end

```
var integer x1 = 25;  
var integer y1 = 25;  
emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
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  emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
  if key == KEY_LEFT then  
    x1 = x1 - 1;  
  else/if key == KEY_RIGHT then  
    x1 = x1 + 1;  
  else/if key == KEY_UP then  
    y1 = y1 - 1;  
  else/if key == KEY_DOWN then  
    y1 = y1 + 1;  
  end
```

```
  if key == KEY_a then  
    x2 = x2 - 1;  
  else/if key == KEY_d then  
    x2 = x2 + 1;  
  else/if key == KEY_w then  
    y2 = y2 - 1;  
  else/if key == KEY_s then  
    y2 = y2 + 1;  
  end
```

```
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
  emit GRAPHICS_DRAW_PIXEL(x1,y1);  
  emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
  emit GRAPHICS_DRAW_PIXEL(x2,y2);
```

```
end
```

par do

```
  var integer x1 = 25;  
  var integer y1 = 25;  
  emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
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    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
    if key == KEY_LEFT then  
      x1 = x1 - 1;  
    else/if <...> then  
      <...>  
    end  
    emit GRAPHICS_SET_RGB(0xFF,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x1,y1);  
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```

with

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  var integer x2 = 24;  
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    var integer key = await KEY_PRESS;  
    emit GRAPHICS_SET_RGB(0x00,0x00,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x2,y2);  
    if key == KEY_a then  
      x2 = x2 - 1;  
    else/if <...> then  
      <...>  
    end  
    emit GRAPHICS_SET_RGB(0x00,0xFF,0x00);  
    emit GRAPHICS_DRAW_PIXEL(x2,y2);  
  end
```

end

Paralelismo Lógico

- Distinção entre concorrência e paralelismo
- Modelo de execução síncrono
 - sem locks
 - determinístico
- `par` , `par/and` , `par/or`

Trabalho 1

- Criar um jogo ou aplicação
 - partir do exercício 3.1

Trabalho 1

- Demonstrações
- Criatividade
- “Competição” entre ideias e não entre implementações