

üáõÝİóÇ³Ý»ñ ı ³éç³¹ñ³ÝùÝ»
ñ (task)

üáõÝíóÇ³Ý»ñÁ ì ³é³ç³¹ñ³ÝùÝ»ñ

- üáõÝíóÇ³Ý»ñÁ ì ³é³ç³¹ñ³ÝùÝ»ñÁ (task) ì»ñÇÉá·áõÙ ÑÝ³ñ³íáñáõÃÛáõÝ »Ý ï³ÉÇë ÙÇìÝáõÛÝ ÁÝÃ³ó³í³ñ·Á ï³í³ñ»É Ìñ³·ñÇ ï³ñμ»ñ ï»Õ»ñÇó:
- ,ñ³Ýù Ý³ì ÑÝ³ñ³íáñáõÃÛáõÝ »Ý ï³ÉÇë Ù»Í ·áñÍÁÝÃ³óÝ»ñÁ μ³Á³Ý»É ³í»ÉÇ ψáùñ Ù³ë» ñÇ, ÇÝãÁ á³ñ½»óÝáõÙ ¿ Ìñ³·ñÇ ÁÝÃ»éÝ»ÉÇáõÃÛáõÝÁ ì ï³ñ·³μ»ñáõÛÁ (ÇÝãá»ë » ÝÃ³íñ³·ñ»ñÁ):
- Øáõïù/»Éù ³ñ·áõÙ»ÝíÝ»ñÇ ÙÇçáóái ïïÛ³ÉÝ»ñÁ ï³ñ»ÉÇ ¿ ψáË³Ýó»É ÁÝÃ³ó³í³ñ·ÇÝ ì ³Û¹ï»ÕÇó Ñ»ï ψáË³Ýó»É ï³ÝááÕ Ìñ³·ñÇÝ:
- ²é³ç³¹ñ³ÝùÝ»ñÁ ì ýáõÝíóÇ³Ý»ñÁ ï³ñμ»ñíáõÙ »Ý Ñ»ïìùÛ³É ï³ÝáÝÝ»ñái.
 - üáõÝíóÇ³Ý á»ïù ¿ ï³í³ñíÇ Ýù³Ý³ïÛ³Ý Ù»Í Á³ù³Ý³ïÛÇÝ ÙÇç³íáñáõÙ, ³é³ç³¹ñ³ÝùÁ ï³ñáÕ ¿ á³ñáõÝ³í»É Á³ù³Ý³ïÇ ï³é³í³ñÛ³Ý ï³éáóóí³íùÝ»ñ:
 - üáõÝíóÇ³Ý ï³ñáÕ ¿ ï³Ýã»É ýáõÝíóÇ³, áÇ ï³ñáÕ ï³Ýã»É ³é³ç³¹ñ³Ýù: ²é³ç³¹ñ³ÝùÁ ï³ñáÕ ¿ ï³Ýã»É ³ÛÉ ³é³ç³¹ñ³ÝùÝ»ñ ì ýáõÝíóÇ³Ý»ñ:
 - üáõÝíóÇ³Ý á»ïù ¿ áõÝ»Ý³ ³ù»Ý³ùÇãÁ Ù»Í ÛáõïùÇ ³ñ·áõÙ»Ýí: ²é³ç³¹ñ³ÝùÁ ï³ñáÕ ¿ áõÝ»Ý³É ó³Ýí³ó³í Áíái ³ñ·áõÙ»ÝíÝ»ñ ï³Û ï³ñáÕ ¿ ³ñ·áõÙ»Ýí ááõÝ»Ý³É:
 - üáõÝíóÇ³Ý í»ñ³¹³ñÓÝáõÙ ¿ Ù»Í ³ñÁ»ù: ²é³ç³¹ñ³ÝùÝ ³ñÁ»ùÝ»ñ áÇ í»ñ³¹³ñÓÝáõÙ:

²é³ç³¹ñ³Ýù (task)

- ²é³ç³¹ñ³ÝùÇ ë³ÑÙ³ÝáðÙÁ ëĭĕĭáðÙ ħ **task** μ³Ý³ÉÇ μ³éáĭ, áñÇÝ ĩ³ñáŎ ħ Ñ»ĭĭ»É áā á³ñĭ³¹Çñ **automatic** μ³Ý³ÉÇ μ³éÁ, áñÇÝ Ñ³çáñ¹áðÙ ħ ³é³ç³¹ñ³ÝùÇ ³Ýĭ³ÝáðÙÁ ĭ Ĩ»ĭ-ĕĭáñ³ĭ»ĭ:
- ²é³ç³¹ñ³ÝùÇ ë³ÑÙ³ÝáðÙÝ ³ĭ³ñĭĭáðÙ ħ **endtask** μ³Ý³ÉÇ μ³éáĭ:
- **automatic** μ³Ý³ÉÇ μ³éáĭ Ñ³Ùĭ³ñ³ñĭáðÙ ħ ĭ»ñ³ĭ³ÝáĭáŎ ³é³ç³¹ñ³Ýù, áñÇ μáÉáñ ĩ³Ýā»ñÇ ĭĭÙ³ÉÝ»ñÁ ÑÇáŎáðĀÙáðÝáðÙ á³ÑĭáðÙ »Ý ¹ÇÝ³ÙÇĭ Ĩ»ñááĭ:
- ²é³ç³¹ñ³ÝùÇ ë³ÑÙ³ÝáðÙÁ ĩ³ñáŎ ħ á³ñáðÝ³ĭ»É Ñ»ĭĭĭÙ³É Ñ³Ùĭ³ñ³ñáðĀÙáðÝÝ»ñÁ`

— **input** ³ñ·áðÙ»ÝĭÝ»ñ

— **output** ³ñ·áðÙ»ÝĭÝ»ñ

— **inout** ³ñ·áðÙ»ÝĭÝ»ñ

— ÁÝĀ³ó³ĭ³ñ·³ÙÇÝ μÉáĭáðÙ Ñ³Ùĭ³ñ³ñĭáðÙ μáÉáñ ĭÇáÇ ĭĭÙ³ÉÝ»ñ:

•²Ùë Ñ³Ùĭ³ñ³ñáðĀÙáðÝÝ»ñÇÝ Ñ³çáñ¹áðÙ ħ ³é³ç³¹ñ³ÝùÇ Ù³ñÙÇÝÁ` Ññ³Ù³ÝÝ»ñÇ Ñ³çáñ¹³ĭ³ÝáðĀÙáðÝÁ:

•²é³Ýó **automatic** μ³Ý³ÉÇ μ³éÇ ³é³ç³¹ñ³ÝùÁ ĕĭĭĭÇĭ ħ` μáÉáñ Ñ³Ùĭ³ñ³ñĭáĭ ĭĭÙ³ÉÝ»ñÁ ÑÇáŎáðĀÙáðÝáðÙ á³ÑĭáðÙ »Ý ĕĭĭĭÇĭ Ĩ»ñááĭ: ²Ù¹ ĭĭÙ³ÉÝ»ñÁ ĭù·ĭ³·áñĭĭ»Ý ³é³ç³¹ñ³ÝùÇ μáÉáñ ÙÇ³Á³Ù³Ý³ĭ ĩ³³ñĭáŎ ĩ³Ýā»ñáðÙ: **automatic** ³é³ç³¹ñ³ÝùÇ ĭĭÙ³ÉÝ»ñÁ ÑÇáŎáðĀÙáðÝáðÙ ĭ» Ŏ³μ³ßĔĭáðÙ »Ý ¹ÇÝ³ÙÇĭ Ĩ»ñááĭª Ùáðñ³ù³ÝāÙáðñ ĩ³ÝāÇ Ñ³Ù³ñ: ²ÙÝ ³é³ç³¹ñ³ÝùÝ»ñÁ, áñáÝù ĭ» ñ³ĭ³ÝáĭáŎ »Ý, á»ĭù ħ Ñ³Ùĭ³ñ³ñĭ»Ý áñá»ë **automatic**, áñá»ë½Ç ³é³ç³¹ñ³ÝùÇ ÙÇ³Á³Ù³ĭÙ³ ĩ³Ýā»ñÁ á³Ŏ³ĭ³Ŏ»Ý ÙÇÙÙ³Ýó ĭĭÙ³ÉÝ»ñÁ: **automatic** ³é³ç³¹ñ³ÝùÁ á»ĭù ħ ĩ³ÝáĭÇ Çñ ÑÇ»ññĔÇĭ ³Ýĭ³ÝáðÙáĭ:

Ué³ç³¹ñ³ÝùÇ ë³ÑÛ³ÝñŁ u İ³Ýã 1

- ²é³ç³¹ñ³ÝùÁ İ³ÝãáÕ Ññ³Û³ÝÁ á»İù ĸ Ùáõİù/»Éù ³ñ·áõÛ»ÝİÝ»ñÁ ĸáË³ÝóÇ ĸ³İ³·Í»ñáõÛ ëİáñ³İ» İáÍ μ³Á³ÝİÍ ³ñİ³Ñ³ÛİáõÃÛáõÝÝ»ñÇ óáõóİÇ İ»ëùáÍ: ²é³ç³¹ñ³ÝùÇ İ³ÝãÇ Ół³ã³ĸÁ Ñ»İłÛ³ÉÝ ĸ.

<name_of_task> (*<expression1>*,*<expression2>*,...) ;

áñİ»Õ *<name_of_task>*-Á ³é³ç³¹ñ³ÝùÇ ³Ýİ³ÝáõÛÝ ĸ, *<expression1>*, *<expression2>*,... Ùáõİù/»Éù ³ñ·áõÛ»ÝİÝ»ñÝ »Ý:

- °Ã» ³é³ç³¹ñ³ÝùÇ ë³ÑÛ³ÝáõÛÁ ³ñ·áõÛ»ÝİÝ»ñ ááõÝÇ, ³ÛÝ İ³ÝáíáõÛ ĸ Ýß»ÉáÍ ÛÇ³ÛÝ ³ÝáõÝÁ.

<name_of_task> ;

- ²ñ·áõÛ»ÝİÝ»ñÇ óáõóİÁ á»İù ÉÇÝÇ ÝáõÛÝ Ñ³çáñ¹Û³Ý İ³ñ·áÍ, ÇÝã»ë ¹ñ³Ýù Ñ³Ûİ³ñ³ñİ»É »Ý ³é³ç³¹ñ³ÝùÇ ë³ÑÛ³ÝÛ³Ý Û»ç:
- Ð»İłÛ³É ûñÇÝ³İÁ óáõó³¹ñáõÛ ĸ ³é³ç³¹ñ³ÝùÇ ë³ÑÛ³ÝÛ³Ý u İ³ÝãÇ İ³¹²Û³İ»ñááõÛÁ.

task my_task;

input a, b;

inout c;

output d, e;

Ué³ç³¹ñ³ÝùÇ ë³ÑÛ³ÝnŁ u İ³Ýã 2

```
begin // ³Ûëï»Õ ï»Õ³¹ñíáðÛ »Ý ³é³ç³¹ñ³ÝùÇ ³ßË³í³ÝùÝ Çñ³í³ÝóÝáÕ Ññ³Û³ÝÝ»ñÁ
c = foo1; // »ÉùÇ ³ñ·áðÛ»ÝíÝ»ñÇÝ í»ñ³·ñ»É
d = foo2; // ³é³ç³¹ñ³ÝùÇ ³ßË³í³ÝùÇ ³ñ¹ÛáðÝùÝ»ñÁ
e = foo3;
end
endtask
```

Ð»ïŁÛ³É Ññ³Û³Ýáí İ³ÝãíáðÛ ĸ my_task ³é³ç³¹ñ³ÝùÁ`
my_task (v, w, x, y, z);
İ³ÝãÇ (v, w, x, y, z) ³ñ·áðÛ»ÝíÝ»ñÁ Ñ³Û³á³³ëË³ÝáðÛ »Ý (a, b, c, d, e) Ûáðïù»Éù ³ñ·áðÛ»ÝíÝ»ñÇÝ, áñáÝù
Ñ³Û³ñ³ñí»É »Ý ³é³ç³¹ñ³ÝùÇ ë³ÑÛ³ÝÛ³Ý Û»Ç: ²é³ç³¹ñ³ÝùÇ İ³ÝãÇ Á³Û³Ý³İ **input** u **inout** ĩÇâÇ (a, b, c) ³ñ·áðÛ»
ÝíÝ»ñÁ ëí³ÝáðÛ »Ý v, w, x ÷á÷áËË³í³ÝÝ»ñÇ ³ñÁ»ùÝ»ñÁ:
a = v;
b = w;
c = x;
²é³ç³¹ñ³ÝùÇ İ³í³ñÛ³Ý ³ñ¹ÛáðÝùÝ»ñÁ ï»Õ³¹ñíáðÛ »Ý **output** u **inout** ĩÇâÇ c, d, e ÷á÷áËË³í³ÝÝ»ñáðÛ: °ñµ
³é³ç³¹ñ³ÝùÇ İ³í³ñáðÛÝ ³í³ñííáðÛ ĸ, Íñ³·ñÇ İ³é³í³ñáðÛÁ í»ñ³¹³ñÓíáðÛ ĸ İ³ÝãáÕ Íñ³·ñÇÝ, áñÁ c, d, e
÷á÷áËË³í³ÝÝ»ñáí ëí³óí³í ³ñ¹ÛáðÝùÝ»ñÁ í»ñ³·ñáðÛ ĸ İ³ÝãáÕ Íñ³·ñÇ x, y, z ÷á÷áËË³í³ÝÝ»ñÇÝ`
x = c;
y = d;
z = e;

Առաջադրանքի օրինակ (շարունակելի)

```
module traffic_lights;
reg clock, red, amber, green; // i³i³ûçý çùááõéëý»ñç, i³ñùçñ, 1»õçý և i³ý³ã ·áõûý»ñç
// Éáõûë»ñç íçð³íý»ñç é»·çëiñý»ñ
parameter on = 1, off = 0; // on-ùç³óý íç×³í, off-³ýç³í³í íçð³í
parameter red_tics = 350, amber_tics = 30, green_tics = 200; // Éáõûë»ñç iláõáõãûáõýá
// ë³ñû³ýáõ ã³ñ³ù»iñ»ñ
initial red = off; // i³É Éáõûë»ñç ëi½μý³í³ý íç×³íý»ñÁ
initial amber = off;
initial green = off;
always
begin // Éáõûë»ñç i³é³í³ñû³ý Ñ³çáñ¹³i³ýáõãûáõýá.
    red = on; // ùç³óý»É i³ñùçñ ÉáõûëÁ
    light(red, red_tics); // ëá³ë»É` i³ýã»É light ³é³ç³¹ñ³ýùÁ
    green = on; // ùç³óý»É i³ý³ã ÉáõûëÁ
    light(green, green_tics); // ëá³ë»É
    amber = on; // ùç³óý»É 1»õçý ÉáõûëÁ
    light(amber, amber_tics); // ëá³ë»É
end
```

Առաջադրանքի օրինակ (շարունակություն)

```
// light ³é³ç³¹ñ³ÝùÇ ë³ÑÛ³ÝáðÙ: ²Ûë ³é³ç³¹ñ³Ýùáí ÓÙ³íañíaðÙ ¿ Å³Û³Ý³i³ÛÇÝ //Ñ³á³ÕáðÙ, áñÇ  
iláÕáðÃÛáðÝÁ Ñ³i³ë³ñ ¿ clock ÇÙááðÉëÝ»ñÇ tics Áíáí //á³ñµ»ñáðÃÛáðÝÝ»ñÇ: ²Û¹  
Ñ³á³ÕÛ³Ý ³i³ñiÇÝ ÉáðÛëÝ ³Ýç³ííaðÙ ¿:
```

```
task light;
```

```
output color;
```

```
input [31:0] tics;
```

```
begin
```

```
repeat (tics) //íñiÝ»É tics ³Ý·³Û
```

```
  @ (posedge clock);
```

```
  color = off; // ³Ýç³i»É ÉáðÛëÁ
```

```
end
```

```
endtask
```

```
always // clock i³i³ÛÇÝ ³½¹³Ýß³ÝÇ ÓÙ³íañíaðÙ
```

```
begin
```

```
  #100 clock = 0;
```

```
  #100 clock = 1;
```

```
end
```

```
endmodule // traffic_lights.
```

Վերլուղ \$ոԼԼԿԿհաներ

- $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{í}\rangle\text{ñ}^3\text{ñ}^3\text{ñ}^3\text{ó}^3\text{á}^3\text{õ}^3\text{ù}^3$ չ $\text{ù}\rangle\text{í}^3$ $\text{ñ}^3\text{Á}\rangle\text{ù}$, $\text{á}\text{ñ}^3\text{Á}$ $\text{í}^3\text{ñ}^3\text{á}^3\text{Õ}$ չ $\text{ù}\cdot\text{í}^3\cdot\text{á}\text{ñ}^3\text{í}\rangle\text{É}$ $\text{ñ}^3\text{í}^3\text{Ñ}^3\text{ù}^3\text{í}^3\text{á}^3\text{õ}^3\text{Á}\text{ù}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{Ý}\rangle\text{ñ}^3\text{á}^3\text{õ}^3\text{ù}^3$:
 $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{Ñ}^3\text{ù}^3\text{í}^3\text{ñ}^3\text{ñ}^3\text{í}^3\text{á}^3\text{õ}^3\text{ù}^3$ չ **function** և **endfunction** $\mu^3\text{Ý}^3\text{É}^3\text{Ç}$ $\mu^3\text{é}\rangle\text{ñ}^3\text{á}\text{í}$: $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{á}^3\text{õ}^3\text{Ý}^3\text{Ç}$ $\text{í}\rangle\text{É}^3\text{Ç}$
 $\text{ë}^3\text{Ñ}^3\text{ù}^3\text{Ý}^3\text{Ç}$ $\text{í}\rangle\text{í}$ $\text{Ñ}^3\text{Ý}^3\text{ñ}^3\text{í}^3\text{á}^3\text{ñ}^3\text{á}^3\text{õ}^3\text{Á}\text{ù}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{Ý}\rangle\text{ñ}$, $\text{ù}^3\text{Ý}$ $\text{é}^3\text{Ç}^3\text{í}^3\text{ñ}^3\text{Ý}^3\text{ù}^3\text{Á}$: $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{á}\rangle\text{í}\text{ù}$ չ $\mu^3\text{í}^3\text{ñ}^3\text{ñ}^3\text{Ç}$ $\text{Ñ}\rangle\text{í}\text{ü}\text{á}^3\text{É}$
 $\text{í}^3\text{Ý}^3\text{á}^3\text{Ý}^3\text{Ý}\rangle\text{ñ}^3\text{Ç}^3\text{Ý}$.

•1. $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{á}\text{Ç}$ $\text{í}^3\text{ñ}^3\text{á}^3\text{Õ}$ $\text{á}^3\text{ñ}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{í}\rangle\text{É}$ $\text{Á}^3\text{ù}^3\text{Ý}^3\text{í}\text{Ç}$ $\text{í}^3\text{é}^3\text{í}^3\text{ñ}^3\text{ù}^3\text{Ý}$ $\text{á}\text{ñ}$ չ $\text{Ñ}^3\text{ñ}^3\text{ù}^3\text{Ý}$: $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{á}\rangle\text{í}\text{ù}$ $\text{á}\rangle\text{Ý}$
 $\text{í}^3\text{ñ}^3\text{á}^3\text{Õ}$ $\text{ù}\cdot\text{í}^3\cdot\text{á}\text{ñ}^3\text{í}\rangle\text{É}$ **#**, **@**, **í}ù wait** $\text{ë}\text{Ç}\text{ù}^3\text{í}^3\text{á}^3\text{É}^3\text{Ý}\rangle\text{ñ}$ $\text{í}^3\text{ù}$ $\text{í}^3\text{é}^3\text{á}^3\text{õ}^3\text{ó}^3\text{í}^3\text{ù}^3\text{Ý}\rangle\text{ñ}$:

•2. $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{á}\text{Ç}$ $\text{í}^3\text{ñ}^3\text{á}^3\text{Õ}$ $\text{í}^3\text{Ý}^3\text{á}\rangle\text{É}$ $\text{é}^3\text{Ç}^3\text{í}^3\text{ñ}^3\text{Ý}^3\text{ù}$, $\text{ü}^3\text{Ý}$ $\text{í}^3\text{ñ}^3\text{á}^3\text{Õ}$ չ $\text{í}^3\text{Ý}^3\text{á}\rangle\text{É}$ $\text{ü}^3\text{É}$ $\text{ý}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{í}^3\text{ó}^3\text{Ç}^3\text{Ý}\rangle\text{ñ}$:

•3. $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{á}\rangle\text{í}\text{ù}$ չ $\text{á}^3\text{õ}^3\text{Ý}\rangle\text{Ý}^3$ $\text{é}^3\text{é}^3\text{í}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{ù}$ $\text{ù}\rangle\text{í}$ $\text{ü}^3\text{á}^3\text{õ}^3\text{í}\text{ù}\text{Ç}$ $\text{í}^3\text{ñ}^3\text{á}^3\text{õ}^3\text{ù}\rangle\text{Ý}^3\text{í}$ **input** $\text{í}\text{Ç}\text{á}\text{Ç}$:

•4. $\text{üáõÝíóÇ}^3\text{Ý}$ $\text{ü}\text{Ç}$ $\text{ë}^3\text{Ñ}^3\text{ù}^3\text{Ý}^3\text{á}^3\text{õ}^3\text{ù}^3\text{Á}$ $\text{á}\rangle\text{í}\text{ù}$ չ $\text{Ý}\rangle\text{ñ}^3\text{é}\text{Ç}$ $\text{ý}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{í}^3\text{ó}^3\text{Ç}^3\text{Ý}$ $\text{í}^3\text{ñ}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{ù}^3\text{Á}$ $\text{ý}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{í}^3\text{ó}^3\text{Ç}^3\text{Ý}$ $\text{é}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{Á}$ $\text{í}^3\text{ñ}^3\text{á}^3\text{Õ}$ $\text{Ý}\rangle\text{ñ}$
 $\text{ñ}^3\text{ù}\text{Ç}^3\text{Ý}$ $\text{÷}\text{á}\text{÷}\text{á}\text{É}^3\text{í}^3\text{Ý}^3\text{Ç}^3\text{Ý}$ $\text{í}\rangle\text{ñ}^3\cdot\text{ñ}^3\text{ù}^3\text{Ý}$ $\text{Ñ}^3\text{ñ}^3\text{ù}^3\text{Ý}$:

• **üáõÝíóÇ}üÇ** $\text{ë}^3\text{Ñ}^3\text{ù}^3\text{Ý}^3\text{ù}^3\text{Ý}$ $\text{Á}^3\text{Ý}^3\text{í}^3\text{Ñ}^3\text{Ý}^3\text{á}^3\text{õ}^3\text{ñ}$ $\text{í}^3\text{é}^3\text{á}^3\text{õ}^3\text{ó}^3\text{í}^3\text{ù}^3\text{Á}$ $\text{Ñ}\rangle\text{í}\text{ü}\text{á}^3\text{É}^3\text{Ý}$ չ.

function <range_or_type> <name_of_function> ;

<tf_declaration> //÷á÷áÉ}í}Ý}ñ}Ç $\text{Ñ}^3\text{ù}^3\text{í}^3\text{ñ}^3\text{á}^3\text{õ}^3\text{ù}^3$

<statement> //ýáõÝíóÇ}üÇ $\text{í}^3\text{é}^3\text{í}^3\text{ñ}^3\text{Ý}^3\text{ù}^3\text{Á}$ $\text{á}\text{ñ}^3\text{á}^3\text{á}^3\text{á}^3\text{Õ}$ $\text{Ñ}^3\text{ñ}^3\text{ù}^3\text{Ý}^3\text{Ý}\rangle\text{ñ}^3\text{Á}$

endfunction

- $\text{ü}^3\text{é}^3\text{í}^3\text{á}^3\text{õ}^3\text{ñ}$ <range_or_type> $\text{í}^3\text{á}^3\text{á}^3\text{á}^3\text{õ}^3\text{ù}^3$ $\text{í}^3\text{ñ}^3\text{í}^3\text{á}^3\text{õ}^3\text{ù}^3$ չ $\text{ý}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{í}^3\text{ó}^3\text{Ç}^3\text{Ý}$ $\text{ü}^3\text{á}^3\text{í}$ $\text{í}\rangle\text{ñ}^3\text{í}^3\text{ñ}^3\text{ó}^3\text{í}^3\text{á}^3\text{õ}^3$ $\text{ç}^3\text{á}\text{ç}^3\text{á}\text{É}^3\text{í}^3\text{Ý}^3\text{Ç}$ $\mu^3\text{Ç}^3\text{Á}\rangle\text{ñ}^3\text{Ç}$
 $\text{í}\text{Ç}\text{ñ}^3\text{á}^3\text{õ}^3\text{ù}^3\text{Á}^3$ ($[\text{n}:\text{m}]$ $\text{í}\rangle\text{è}^3\text{ù}^3\text{á}\text{í}$) և $\text{í}\text{Ç}\text{á}\text{Á}$, $\text{Á}\rangle\text{ñ}$ $\text{ü}^3\text{Ý}$ **integer** $\text{í}^3\text{ù}$ չ **real** չ: $\text{á}\rangle\text{ñ}$ <range_or_type> $\text{í}^3\text{á}^3\text{á}^3\text{á}^3\text{õ}^3\text{ù}^3$
 $\mu^3\text{ó}^3\text{í}^3\text{á}^3\text{á}^3\text{õ}^3\text{ù}^3$ չ, á^3 $\text{ý}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{í}^3\text{ó}^3\text{Ç}^3\text{Ý}$ $\text{ü}^3\text{á}^3\text{í}$ $\text{í}\rangle\text{ñ}^3\text{í}^3\text{ñ}^3\text{ó}^3\text{í}^3\text{á}^3\text{õ}^3$ $\text{ç}^3\text{á}\text{ç}^3\text{á}\text{É}^3\text{í}^3\text{Ý}^3\text{Á}$ $1-\mu^3\text{Ç}^3\text{Á}$ $\text{é}\rangle\text{ñ}$ $\text{Ç}^3\text{é}^3\text{í}^3\text{ñ}$ չ:
<name_of_function> $\text{ý}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{í}^3\text{ó}^3\text{Ç}^3\text{Ý}$ $\text{é}^3\text{á}^3\text{õ}^3\text{Ý}^3\text{Á}$ չ $\text{Ç}^3\text{á}\rangle\text{ñ}$ $\text{Ý}^3\text{í}\text{Ç}^3\text{Ý}^3\text{Ç}^3\text{í}^3\text{á}^3\text{ñ}^3\text{Á}$: $\text{ú}\text{ñ}\text{Ç}^3\text{Ý}^3\text{í}$,

function [7:0] adder ; // adder $\text{Ý}^3\text{í}^3\text{Ý}^3\text{á}^3\text{õ}^3\text{ü}^3\text{á}\text{í}$ $8-\mu^3\text{Ç}^3\text{Á}$ $\text{é}\rangle\text{ñ}$ $\text{Ç}^3\text{é}^3\text{í}^3\text{ñ}$ $\text{í}\text{Ç}\text{á}\text{Ç}$:

üáõÝĭóÇ³ÛÇ ë³ÑÛ³ÝáõÙÁ

- üáõÝĭóÇ³ÛÇ ë³ÑÛ³ÝáõÙÁ ³Ýµ³ó³Ñ³Ûĭ ĭ»ñááĭ Ñ³Ûĭ³ñ³ñáõÙ ħ Ý»ñùÇÝ é»·Çĭñ, áñÝ áõÝÇ ÝáõÛÝ ³Ýĭ³ÝáõÙÁ, ÇÝã ýáõÝĭóÇ³Ý: ²Ûë é»·ÇëĭñÇ ã³÷ëÁ 1-µÇÃ ħ ĭ³Û ĭñĭáõÙ ħ ýáõÝĭóÇ³ÛÇ Ñ³Ûĭ³ñ³ñÛ³Ý <range_or_type> ¹³ĭĭáõÙ: üáõÝĭóÇ³ÛÇ ë³ÑÛ³ÝÛ³Ý Û»Ç á»ĭù ħ ÉÇÝÇ ýáõÝĭóÇ³ÛÇ ³ßË³ĭ³ÝùÇ ³ñ¹ÛáõÝùÁ ýáõÝĭóÇ³ÛÇ ³ÝáõÝÁ ĭñáÕ Ý»ñùÇÝ ŸáŸáË³ĭ³ÝÇÝ ĭ»ñ³·ñ»Éáõ Ññ³Û³Ý`

getbyte = result_expression;

- **üáõÝĭóÇ³ÛÇ ĭ³ÝãÝ Çñ³ĭ³Ý³óĭáõÙ ħ Ñ»ĭĭÛ³É ĭ³éáõóĭáõÙáĭ.**
<name_of_function> (<expression>,<expression>,...)

üáõÝĭóÇ³ÛÇ ĭ³ÝãÁ ĭ³ñáÕ ħ ÉÇÝ»É áñĭ ħ ³ñĭ³Ñ³ÛĭáõÃÛ³Ý ùá»ñ³ĭáñ: Ð»ĭĭÛ³É ùñÇÝ³ĭáõÙ word ³ñĭ³Ñ³ÛĭáõÃÛáõÝáõÙ getbyte ýáõÝĭóÇ³ÛÇ »ñĭáõ ĭ³Ýã»ñÇó Óĭ³ĭáñĭáõÙ ħ 16-µÇÃ µ³é` µ³ÛÃ»ñÇ ÛÇ³ĭáõÙáĭ.

word = control ? {getbyte(msbyte), getbyte(lsbyte)} : 0;// msbyte ĭ lsbyte ³ñ¹ÛáõÝ³ñ³ñ
//µ³éÇ ³ĭ³· ĭ ĭñĭë»ñ µ³ÛÃ»ñÇ Ñ³ëó»Ý»ñÝ »Ý:

Ֆունկցիայի կիրառության օրինակներ

- `//ե՞ՆՍՅ՝»É Ûá¹áõÉ, áñÁ á³ñáõÝ³íáõÙ ¿ even_parity ³Ýí³ÝáõÙáí ýáõÝíóÇ³`

```
module check_parity;
...
reg [63:0] data;
reg parity; //Ն³βí»É 64-μÇÃ ííÛ³ÉáõÙ ½áõÛ·áõÃÛ³Ý Ñ³Ûí³ÝÇβÁ, »ñμ ³Û¹ ííÛ³ÉÁ ÷áËíáõÙ ¿
always @(data)
begin
parity = even_parity(data); //í³Ýã»É even_parity ýáõÝíóÇ³Ý
$display("Parity status = %b", parity);
end
.....
//ե՞ՆՍՅ՝»É even_parity ýáõÝíóÇ³Ý
function even_parity; //ýáõÝíóÇ³ÛÇ ³βË³í³ÝÛÇ ³ñ¹ÛáõÝùÁ í»ñ³³ñÓíáõÙ ¿ even_parity //
³Ýμ³ó³Ñ³Ûí Ñ³Ûí³ñ³ñíáÕ é»·Çëíñáí
input [63:0] data;
begin
even_parity = ^ data; //í³³ñ»É è»ÕÛ³Ý xor ·áñíáÕáõÃÛáõÝ data-Ç μÁÉáñ μÇÃ»ñÇ Ýí³íÛ³Ûμ
endendfunction //ýáõÝíóÇ³ÛÇ ³՞ՆՍՅ՝Û³Ý ³í³ñí.....
endmodule // check_parity Ûá¹áõÉÇ ³í³ñí
```

Տվյալների գտում

Ինքնավար աշխատանքի շարժումը: Սա առաջին քայլն է ինքնավար աշխատանքի շարժումը: Սա առաջին քայլն է ինքնավար աշխատանքի շարժումը: Սա առաջին քայլն է ինքնավար աշխատանքի շարժումը:

$$y(n) = 0.25x(n) + 0.5x(n-1) + 0.25x(n-2):$$

Քայլեր: 1. Ստանդարտացրեք x-ը և y-ը 8-բիթի թվերի տեսքով:

```
module fir3(clk,x,y);
input clk;
input [7:0] x;
output [7:0] y;
reg [7:0] x1, x2;

always @(posedge clk)
begin
    x1<=x; // x ինքնավար աշխատանքի շարժումը
    x2<=x1; //x2=x(n-2)
end

assign y=fir3(x, x1, x2);

function [7:0] fir3;
input [7:0] a, b, c;
assign fir3= (a >> 2) + (b >> 1) + (c >> 2);
endfunction

endmodule
```