

Fortranを書こう
(書くとは言っていない)

ψ (プサイ)

@tikal

ledyba.org



本資料の 取り扱い



フリー

素材



A person with short blonde hair, wearing a vibrant red dress and a blue and white patterned shawl, is walking away from the camera on a stone path. The path is flanked by tall, thin trees, creating a sense of depth and a natural setting. The lighting is soft, suggesting a bright but slightly overcast day. The overall mood is serene and contemplative.

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だからお前は誰なんだよ

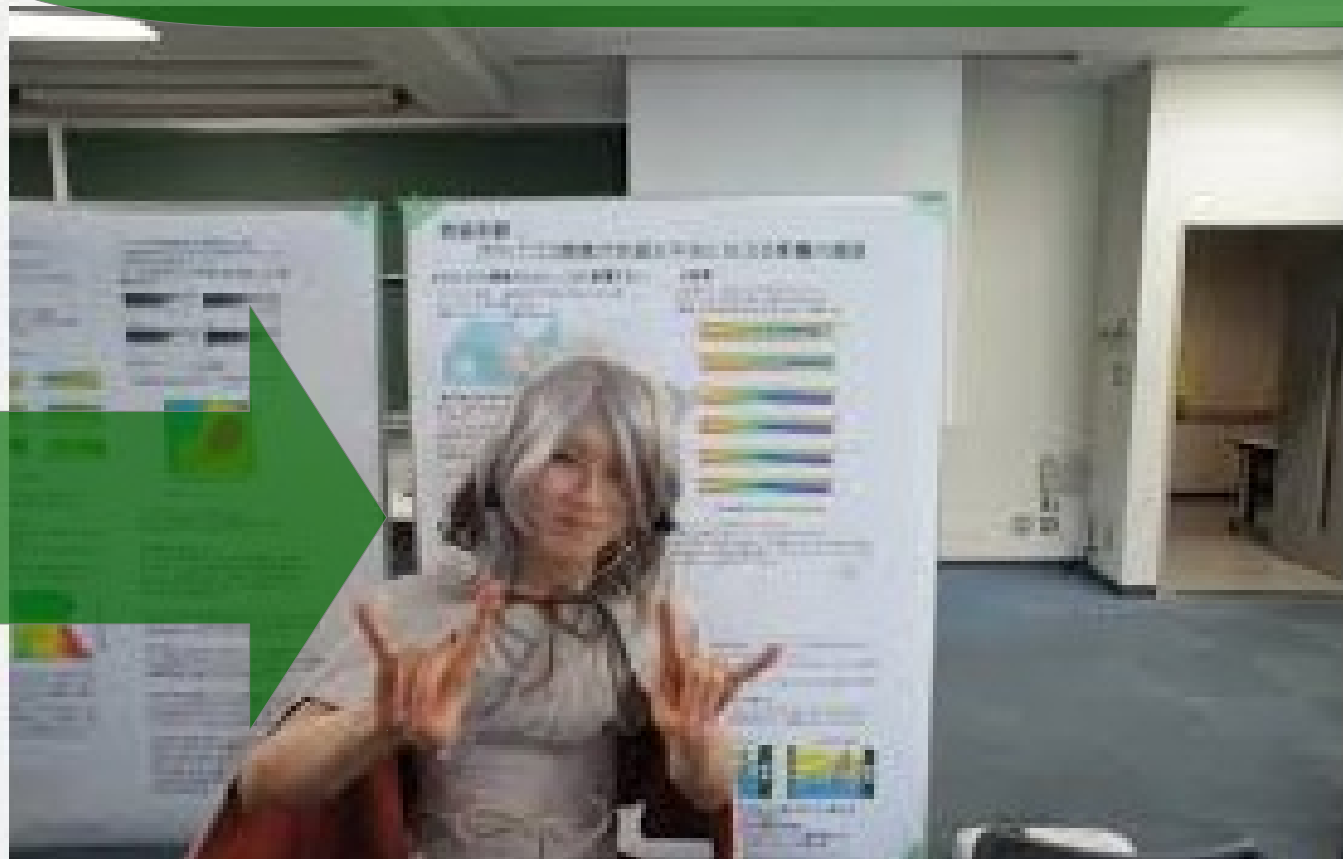
DAKARA OMAEHA DARENANDAYO



Google

いなこん コンちゃん

いなこん ウェブ 動画 コン 画像 地図 ニュー ちゃん



A doll with blonde hair, wearing a red dress and a blue and white striped shawl, is walking on a stone path in a traditional Japanese garden. The background shows bamboo trees and a stone wall.

セキュリティ

& プログラミング

キャンプ

2010

水踏
未踏

2012



ス パ ク リ



夏





A doll with blonde hair, wearing a red kimono and a blue and white striped shawl, stands on a paved path. The background is a blurred outdoor setting with trees and a fence. Overlaid on the image is a semi-transparent white rectangle containing Japanese text in a dark red font.

義理子ヨコ
禁止の会社

A doll with blonde hair, wearing a red dress and a striped shirt, is walking on a paved path in a bamboo forest. The background is slightly blurred, showing the vertical trunks of bamboo trees and green foliage. The lighting is bright, suggesting a sunny day.

機械学習と 自然言語

セキュリティ
やってません…



もう働いて
るの、
じゃあ？

24歳

学生です



あつ...

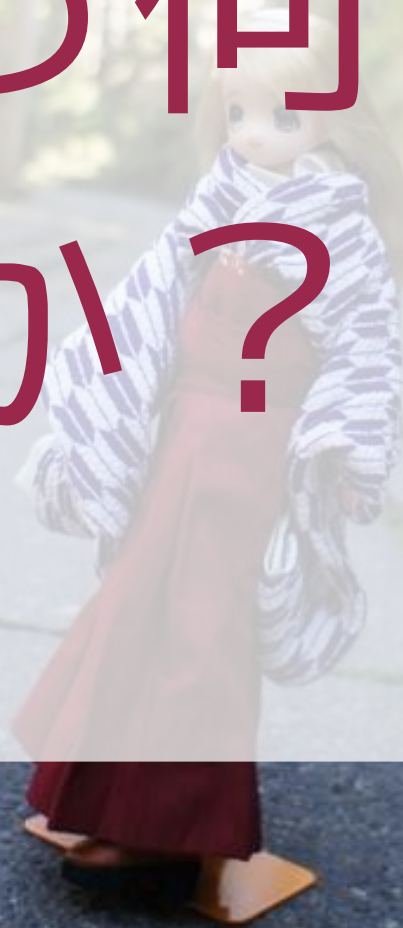
(察し)





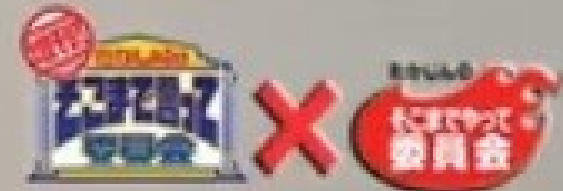
東大
理学部
地球惑星物理学
科

「えっ何やるんですか????」



A person with long white hair, wearing a red dress and a blue and white patterned shawl, is walking away from the camera on a stone path. The path is surrounded by tall, thin trees, possibly bamboo, and the scene is brightly lit, suggesting a sunny day. The background is slightly blurred, focusing attention on the person.

前学科長が



現代の科学では地震予知は不可能

A person wearing a blue and white striped kimono and a red skirt is walking away on a stone path in a traditional Japanese garden. The path is lined with bamboo and other trees, and the scene is captured in a soft, slightly blurred style. The text is overlaid on a semi-transparent white rectangle.

ツイ廃

@rjgeller

なよのぞ





を

する学科

ではなく



地震



天氣



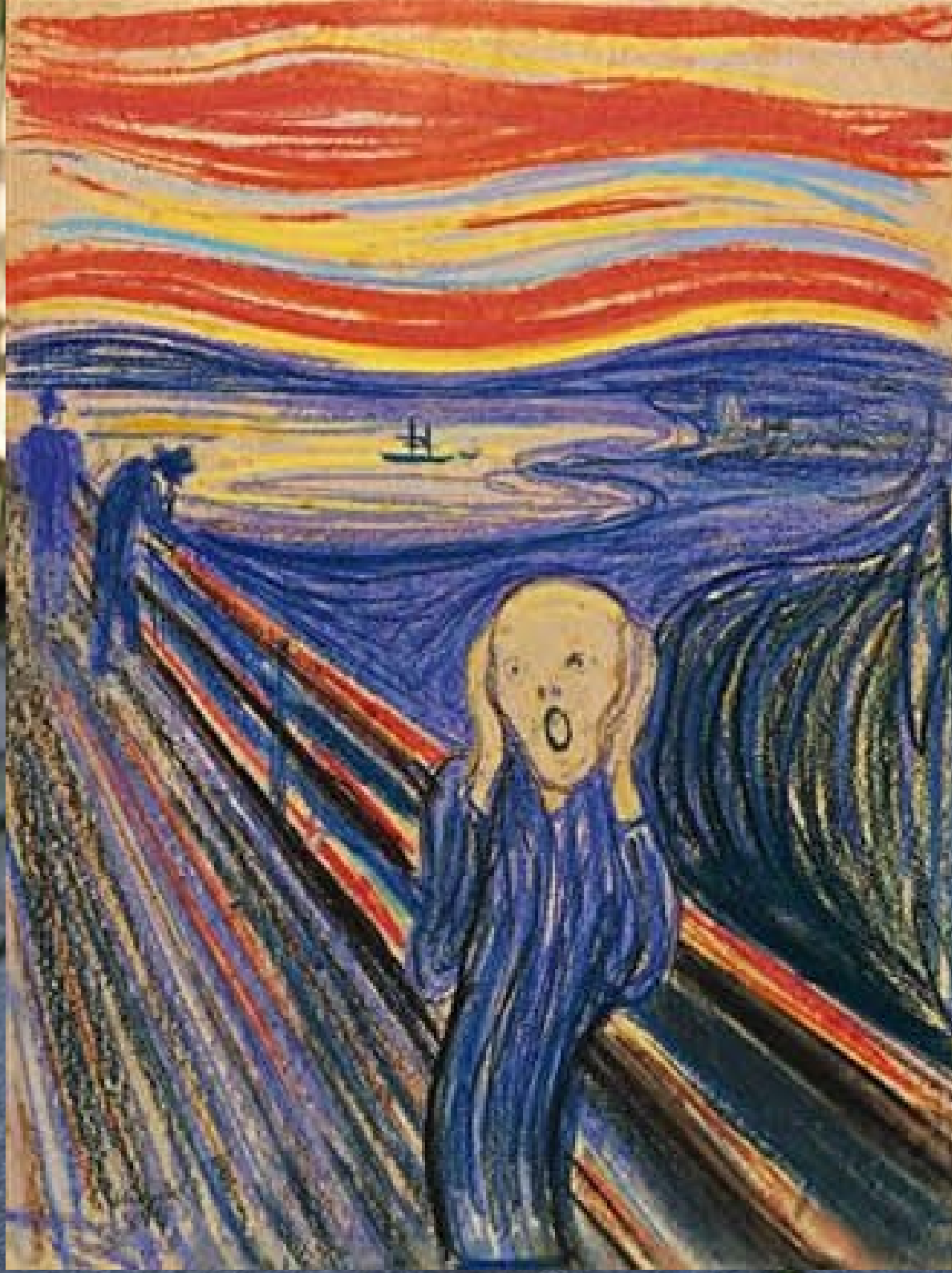
FOR-
TRAN77



40年前

の言語





くらしい



COBOL

59年



それより
新しい！！



モダン



イノベ ーティヴ



白明に
書きたくはない





「書かないと
単位
あげません」

いいいい

加減



卒業

したい





ひえ〜 かしこま。

書いた



書いたやつへのリンク

Fortranが書きたくないなら機械語を埋め込めばいいじゃないっ！



書いて

ない



本日の

本題



Fortranを 書かずに



Fortranを 書こう



どう

やるか



雛見祭



Fortran

ソース



↓ 変換



↓ 変換

機械語

機械語

書けば

なんとかなる

し、かし



今回の 案件



フーリエ

変換



手書き

さ
らしい



朗報



なんと



A doll with long blonde hair, wearing a red dress and a blue and white striped shirt, is walking on a paved path in a bamboo forest. The background is filled with tall bamboo stalks and green foliage, creating a serene and natural atmosphere. The lighting is soft, suggesting a bright but slightly overcast day.

C言語を 機械語に

自動翻訳
してくれる



コンパイラ



A woman in a red kimono and a blue and white patterned haori is walking away from the camera on a stone path in a traditional Japanese garden. The path is flanked by bamboo fences and large rocks. The scene is captured in a soft, slightly blurred style, suggesting a peaceful and traditional atmosphere.

超
便利
ツール

即採用



方金針



1: C 言語

で
書いて
書

2: 機械語に

コン

パイル



3: Fortran

に
埋め込む

4:そして 実行



C言語から コンパイラ



問題点

A person wearing a red dress and a patterned shawl is walking away on a stone path in a traditional Japanese garden. The path is made of large, light-colored stones. The background is filled with lush green trees and a stone wall, creating a serene and natural atmosphere. The overall scene is captured in a soft, slightly blurred style, emphasizing the tranquility of the environment.

プログラムが
実際にどこに
置かれるか



A woman with long blonde hair, wearing a red dress and a blue and white patterned jacket, is walking away from the camera on a stone path. The path is surrounded by tall bamboo trees, creating a dense forest atmosphere. The lighting is soft, suggesting a sunny day. The text is overlaid on a semi-transparent white background.

実行
されるまで
分からない

関数が
呼べない



sin関数は

どこ???

sin関数

main関数



絶対位置
分からない



相対位置
わかる



相対的な
位置は
分かる

sin関数

main関数



具体的

には



相対call

命令命令

のみ使う

A woman with blonde hair, wearing a red dress and a blue and white patterned jacket, is walking away from the camera on a paved path. The path is lined with trees and a fence. A semi-transparent white rectangular box is overlaid on the image, containing the text "Position Independent Executable" in a dark red, sans-serif font.

**Position
Independent
Executable**

リンカー
スクリプト
自分で書く

A doll with blonde hair, wearing a red dress and a blue and white striped shawl, stands on a stone path in a garden. The background is a blurred view of a traditional Japanese building and trees.

A doll with white hair, wearing a red kimono and a white haori with a blue and purple pattern, is walking away on a stone path in a bamboo forest. The scene is overlaid with a semi-transparent white rectangle.

OR

A doll with blonde hair, wearing a red dress and a blue and white striped kimono, is walking away from the camera on a stone path. The path is flanked by a bamboo fence on the left and a stone wall on the right. The background is a dense bamboo forest with sunlight filtering through the trees. A semi-transparent white rectangle is overlaid on the image, containing the text '-pie' in a dark red font.

-pie

```
a79:  c3                retq

00000000000000a7a <ep>:
a7a:  55                push   %rbp
a7b:  48 89 e5          mov    %rsp,%rbp
a7e:  48 83 c4 80       add    $0xfffffffffffffff80,%rsp
a82:  48 89 7d 88       mov    %rdi,-0x78(%rbp)
a86:  48 8b 45 88       mov    -0x78(%rbp),%rax
a8a:  48 8b 00          mov    (%rax),%rax
a8d:  48 89 45 80       mov    %rax,-0x80(%rbp)
a91:  f2 0f 2c 45 80   cvttsd2si -0x80(%rbp),%eax
a96:  89 45 f0          mov    %eax,-0x10(%rbp)
a99:  48 8b 45 88       mov    -0x78(%rbp),%rax
a9d:  48 83 c0 08       add    $0x8,%rax
aa1:  48 89 45 e8       mov    %rax,-0x18(%rbp)
aa5:  8b 45 f0          mov    -0x10(%rbp),%eax
aa8:  48 98            cltq
aaa:  48 83 c0 01       add    $0x1,%rax
aae:  48 8d 14 c5 00 00 00 lea   0x0(,%rax,8),%rdx
ab5:  00
ab6:  48 8b 45 88       mov    -0x78(%rbp),%rax
aba:  48 01 d0          add    %rdx,%rax
abd:  48 89 45 e0       mov    %rax,-0x20(%rbp)
ac1:  8b 45 f0          mov    -0x10(%rbp),%eax
ac4:  48 98            cltq
ac6:  48 c1 e0 04       shl   $0x4,%rax
aca:  48 8d 50 08       lea   0x8(%rax),%rdx
ace:  48 8b 45 88       mov    -0x78(%rbp),%rax
ad2:  48 01 d0          add    %rdx,%rax
ad5:  48 89 45 d8       mov    %rax,-0x28(%rbp)
```

機械語

できた



A doll with long blonde hair, wearing a red dress and a blue-and-white striped kimono, is walking on a paved path in a bamboo forest. The scene is softly lit, suggesting a sunny day. The text 'Fortran' is overlaid in a large, dark red font on a semi-transparent white background.

Fortran

から実行

ちよつとだけ

Fortran

書く

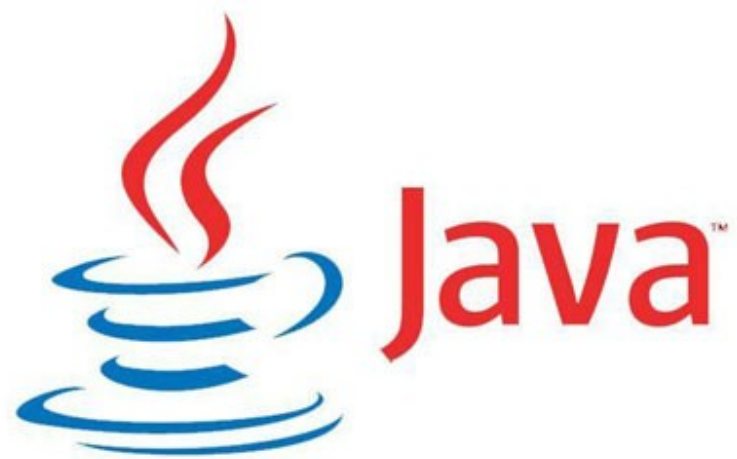
A doll with blonde hair, wearing a red kimono and a striped shawl, is walking away from the camera on a paved path. The path is lined with bamboo trees, and the scene is brightly lit, suggesting a sunny day. The background is slightly blurred, focusing attention on the doll and the overlaid text.

機械語

どう実行？

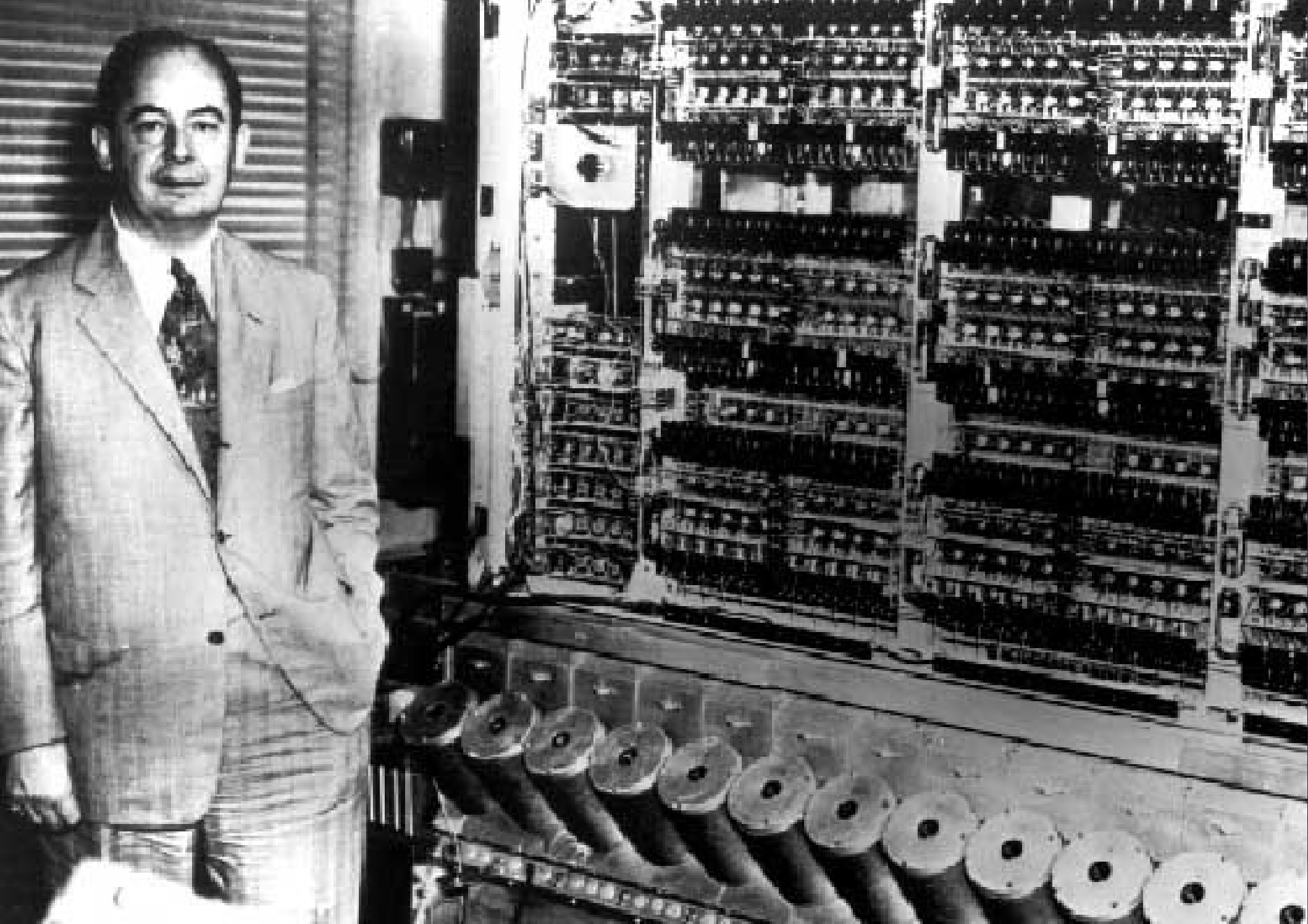
戦略





と

一緒



ハイマーンに

圧倒的

感謝

A doll with blonde hair, wearing a red dress and a blue and white striped scarf, is walking away from the camera on a paved path. The path is surrounded by tall bamboo trees, creating a serene and slightly misty atmosphere. The background is softly blurred, emphasizing the doll in the foreground.

機械語ニ プログラム

機械語二 数の列



数の列

プログラム

a79: 00 00 00 00 00 00 00 00

retq

0000000000000000a7a <ep>:

```

a7a: 55
a7b: 48 89 e5
a7e: 48 83 c4 80
a82: 48 89 7d 88
a86: 48 8b 45 88
a8a: 48 8b 00
a8d: 48 89 45 80
a91: f2 0f 2c 45 80
a96: 89 45 f0
a99: 48 8b 45 88
a9d: 48 83 c0 08
aa1: 48 89 45 e8
aa5: 8b 45 f0
aa8: 48 98
aaa: 48 83 c0 01
aae: 48 8d 14 c5 00 00 00
ab5: 00
ab6: 48 8b 45 88
aba: 48 01 d0
abd: 48 89 45 e0
ac1: 8b 45 f0
ac4: 48 98
ac6: 48 c1 e0 04
aca: 48 8d 50 08
ace: 48 8b 45 88
ad2: 48 01 d0
ad5: 48 89 45 d8

```

```

push    %rbp
mov     %rsp,%rbp
add     $0xfffffffffffffff80,%rsp
mov     %rdi,-0x78(%rbp)
mov     -0x78(%rbp),%rax
mov     (%rax),%rax
mov     %rax,-0x80(%rbp)
cvttsd2si -0x80(%rbp),%eax
mov     %eax,-0x10(%rbp)
mov     -0x78(%rbp),%rax
add     $0x8,%rax
mov     %rax,-0x18(%rbp)
mov     -0x10(%rbp),%eax
cltq
add     $0x1,%rax
lea    0x0(,%rax,8),%rdx
mov     -0x78(%rbp),%rax
add     %rdx,%rax
mov     %rax,-0x20(%rbp)
mov     -0x10(%rbp),%eax
cltq
shl    $0x4,%rax
lea    0x8(%rax),%rdx
mov     -0x78(%rbp),%rax
add     %rdx,%rax
mov     %rax,-0x28(%rbp)

```

Fortran プログラム

読み書き

呼び出し

キャスト

機械語 =
数の配列

プログラム

C言語なら 簡単



A doll with long blonde hair, wearing a red dress and a blue and white striped shawl, is walking away from the camera on a paved path. The path is lined with bamboo trees, and the scene is brightly lit, suggesting a sunny day. The background is slightly blurred, focusing attention on the doll and the overlaid text.

Fortran

型に厳しい

Fortran プログラム

読み書き

呼び出し

キャスト

機械語 =
数の配列

プログラム

関数と
データ
変換不能

どう
する？



構造体で 包む



構造体ニ

あくまで

データ



Fortran プログラム

読み書き

呼び出し

機械語
構造体
IntPtr

キャスト

プログラム
構造体
FuncPtr

関数として
呼び出せる



問題 解決



Fortran

をあんま

書かずに

Fortran

は
書ける

ま と め



A doll with blonde hair, wearing a blue and white striped kimono and a red skirt, stands on a paved path. The background is a blurred outdoor setting with trees and a stone wall. A semi-transparent white rectangle is overlaid on the image, containing the text.

「Fortran で書け」

に限らず

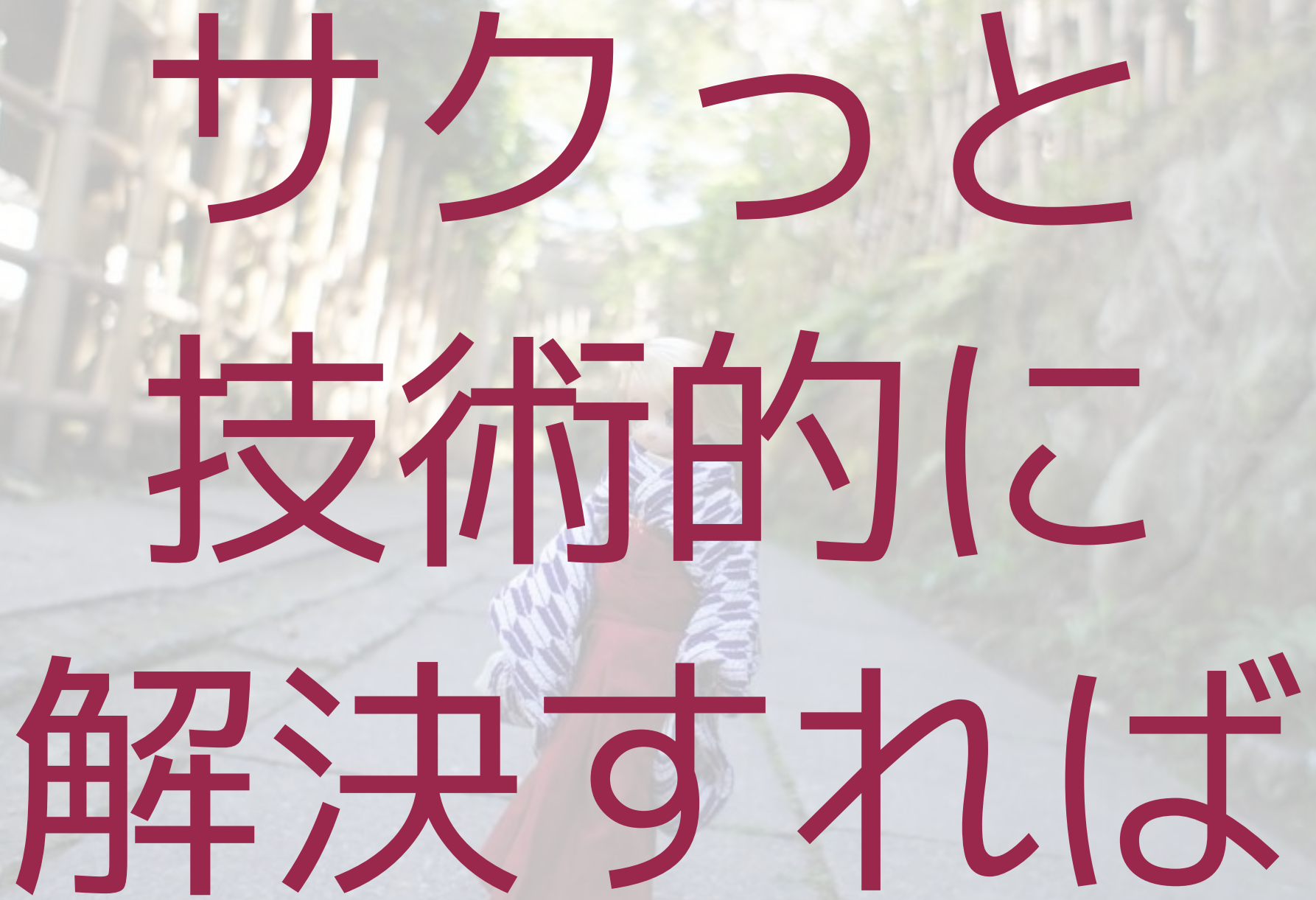


A doll with long blonde hair, wearing a red dress and a blue and white striped shawl, is walking away from the camera on a paved path. The path is surrounded by tall bamboo trees, creating a serene and slightly ethereal atmosphere. The lighting is soft, suggesting a bright but slightly overcast day.

技術的に
解決可能な

政治的 問題は





サクッと
技術的に
解決すれば

