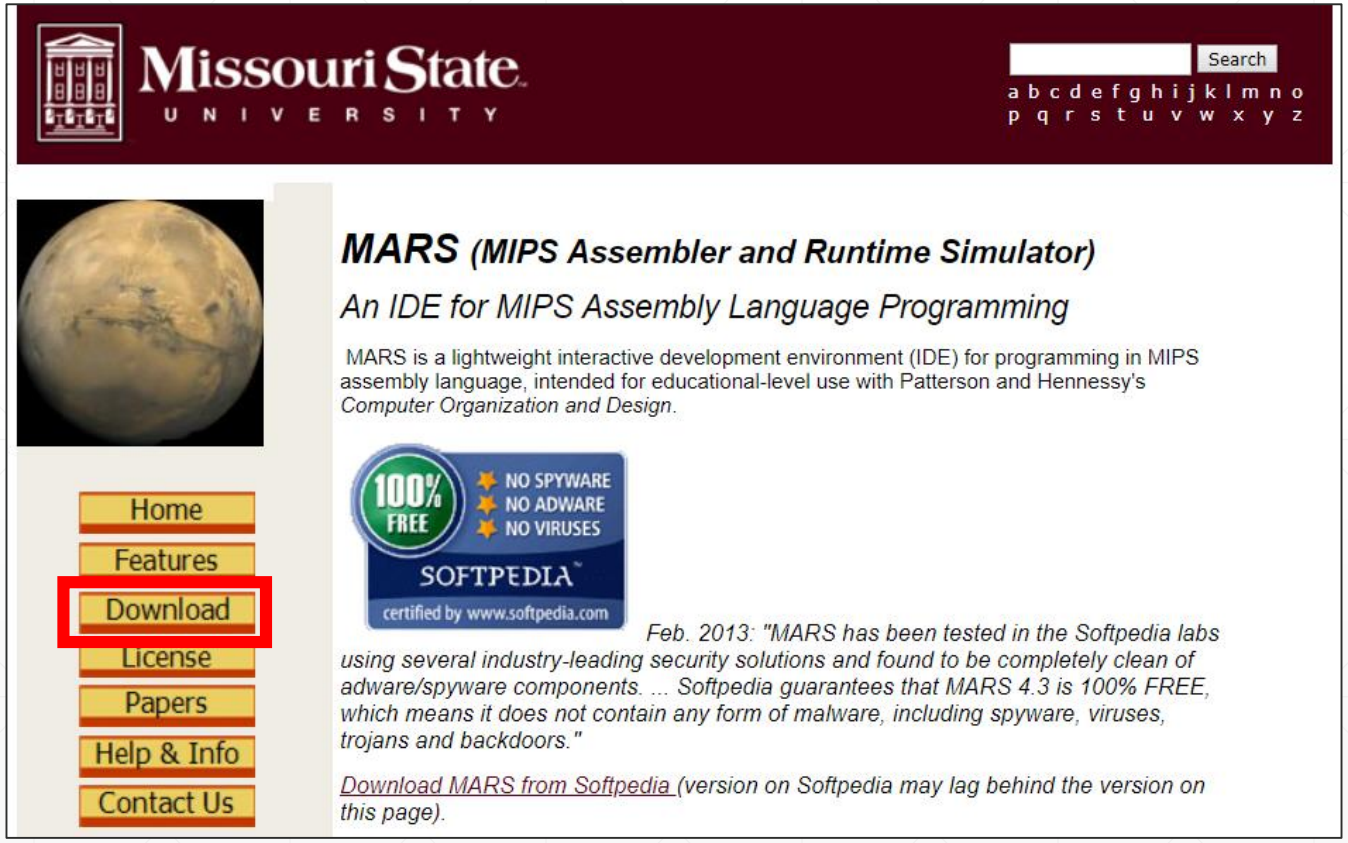
# 1072
# 計算機組織
# 第一次作業

授課老師：蔡文錦
繳交期限：2019/03/31 23:55
(2019/04/01 00:00 後視為遲交)
有作業相關問題請使用New E3聯繫助教

# MARS

http://courses.missouristate.edu/KenVollmar/mars/



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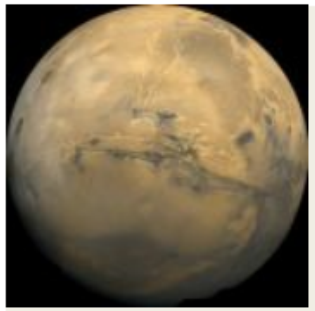

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2 Download MARS V4.5, Aug. 2014 (jar archive including Java source code)

**Note: Is your MARS text unreadably small?** Download and use a new release 1 Java 9, which contains a fix to automatically scale and size AWT and Swing components for High Dots Per Inch (HiDPI) displays on Windows and Linux. Technical details.

*Previous MARS version: MARS v4.4, Aug. 2013*

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NO VIRUSES
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*Feb. 2013: "MARS has been tested in the Softpedia labs using several industry-leading security solutions and found to be completely clean of adware/spyware components. ... Softpedia guarantees that MARS 4.3 is 100% FREE, which means it does not contain any form of malware, including spyware, viruses, trojans and backdoors."*

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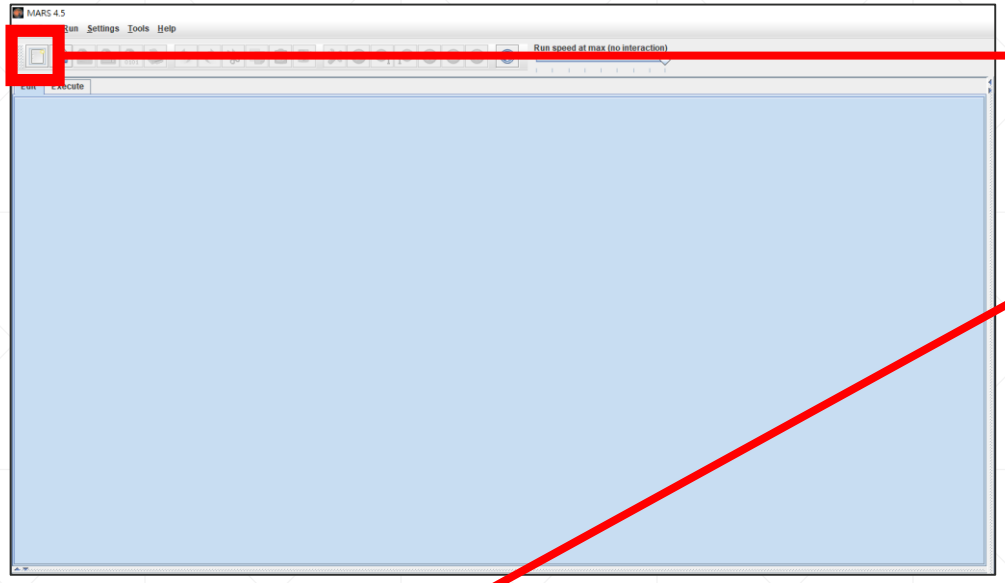
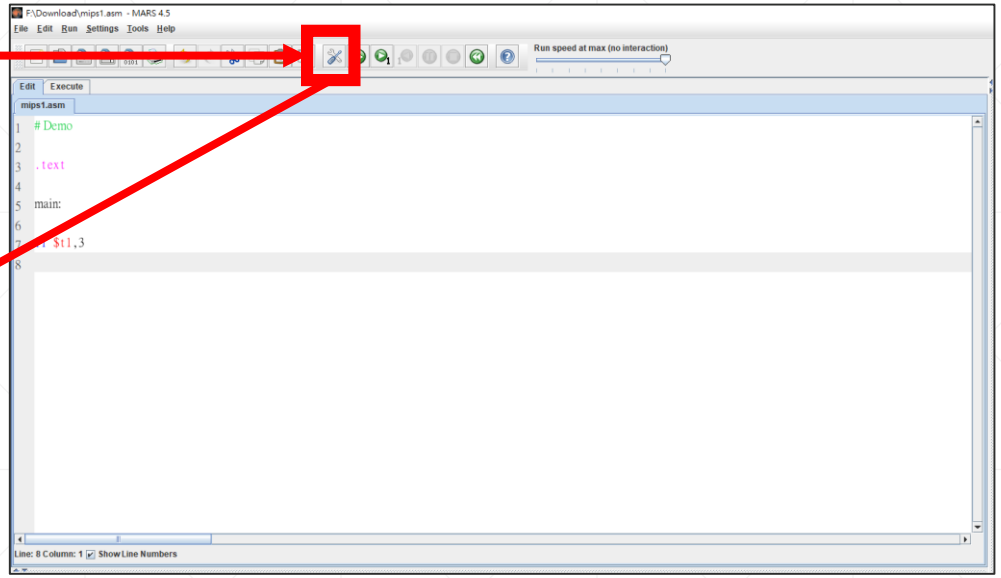
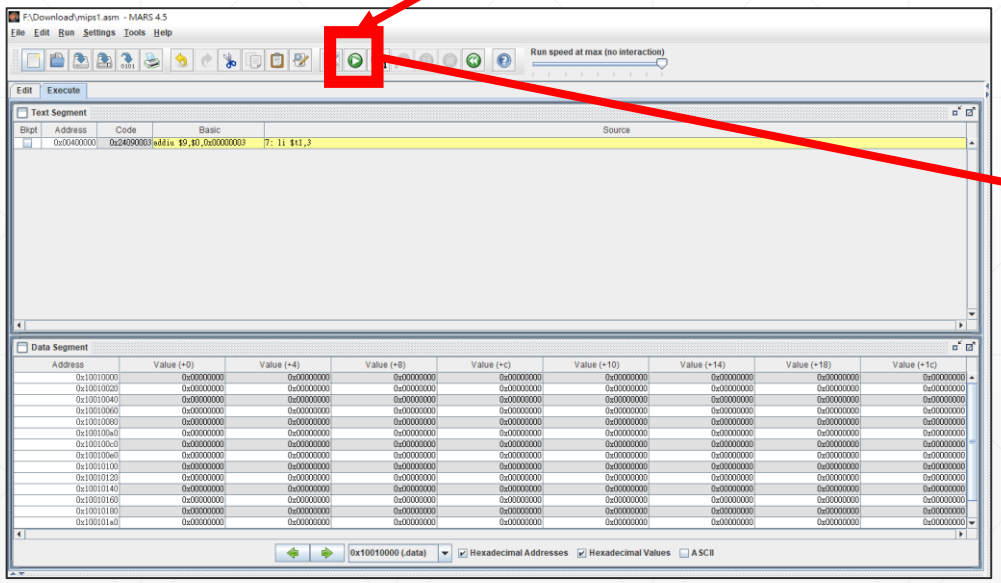
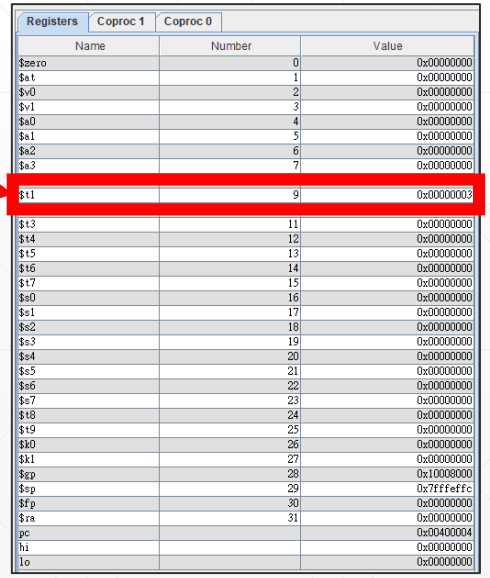
Mars4_5.jar




```
# Demo

.text

main:

li $t1,3
```

# Lab1a 題目說明

- 費氏數列 (30%)
- https://zh.wikipedia.org/wiki/%E6%96%90%E6%B3%A2%E9%82%A3%E5%A5%91%E6%95%B0%E5%88%97
- 請使用遞迴計算輸入項之費氏數列值，未使用遞迴此題不計分
- 輸入範圍：合理範圍內之非負整數
- 輸入範例(詳可參考Lab1a.cpp執行結果)：

0123456 Lab1a, Enter the number n = 10

改成自己的學號

=後要加個空白，10是輸入

- 範例輸出(詳可參考Lab1a.cpp執行結果)：

55

最後不用換行

# Lab1b 題目說明

- 六角形 (30%)
- 請輸出如範例規則之輸出結果
- 輸入範圍：合理範圍內之非負整數，不含0、1
- 此題輸出之最後一行是否有換行皆可

# Lab1b 題目說明

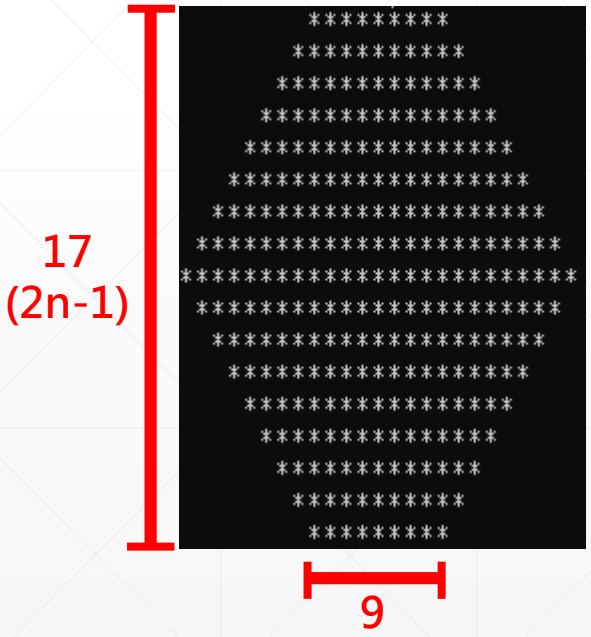
- 輸入範例(詳可參考Lab1b.cpp執行結果)：

0123456 Lab1b, Enter the number n = 9

改成自己的學號

=後要加個空白，9是輸入

- 範例輸出(詳可參考Lab1b.cpp執行結果) ：



# Lab1b 題目說明

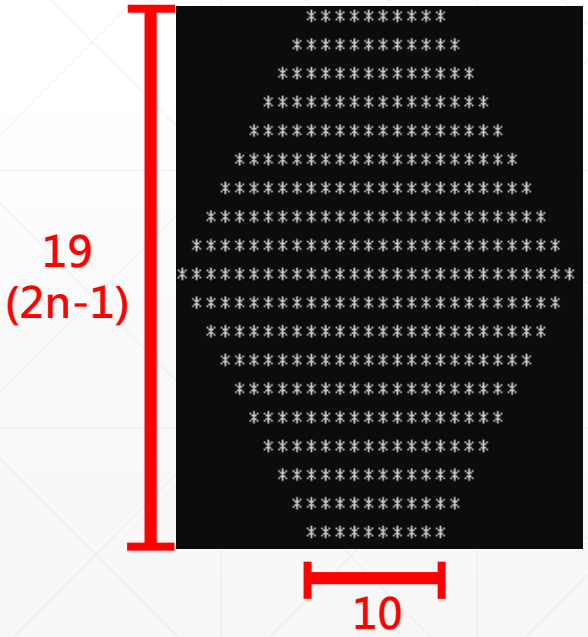
- 輸入範例(詳可參考Lab1b.cpp執行結果)：

0123456 Lab1b, Enter the number n = 10

改成自己的學號

=後要加個空白，10是輸入

- 範例輸出(詳可參考Lab1b.cpp執行結果) ：



# Lab1c 題目說明

- 質數 (40%)
- https://zh.wikipedia.org/wiki/%E7%B4%A0%E6%95%B0
- 請判斷輸入之整數**是否為質數**與**離輸入整數最接近之質數**，若有兩個質數距離相同則**兩個皆輸出**
- 輸入範圍：合理範圍內之非負整數，不含0、1
- 輸入範例(詳可參考Lab1c.cpp執行結果)：

  0123456 Lab1c, Enter the number n = 18

  改成自己的學號

  =後要加個空白，18是輸入

- 範例輸出(詳可參考Lab1c.cpp執行結果)：

  18 is not a prime, the nearest prime is 17 19

  最後不用換行，注意格式

# Lab1c 題目說明

- 輸入範例(詳可參考Lab1c.cpp執行結果)：

  0123456 Lab1c, Enter the number n = 19

  改成自己的學號

  =後要加個空白，19是輸入

- 範例輸出(詳可參考Lab1c.cpp執行結果) ：

  19 is a prime

  最後不用換行，注意格式

# Example code

- Lab1a.cpp、Lab1b.cpp、Lab1c.cpp為各小題之範例檔案
  - 實作MIPS code不需完全照範例檔案內進行轉換，**僅需確認輸入輸出正確並且格式符合作業要求**

- factorial.c、factorial.s為一份簡單的轉換參考範例
  - 可直些修改其中之輸入與輸出內容作為各題作業之基礎
  - 直接將factorial.s以MARS開啟即可執行

# 1072 計算機組織 第一次作業配分

- Lab1a (30%)：
  - 上傳檔案名稱：Lab1a.asm
  - 未使用遞迴得0%
- Lab1b (30%)：
  - 上傳檔案名稱：Lab1b.asm
- Lab1c (40%)：
  - 上傳檔案名稱：Lab1c.asm
  - 全對才給分
- 各題答案輸出輸出格式請參考作業說明，輸出格式錯誤扣該題10分，繳交前請再次確認
- 上傳檔案名稱或檔案類型錯誤每一個檔案扣總分10分，繳交前請再次確認

# 1072 計算機組織 作業繳交規定 每次作業適用

- 作業抄襲，抄襲與被抄襲者該次作業總成績以0分計算
- 作業接受遲交，每遲交一天(以日期計)扣該次作業總分10分
- 有任何特殊情況請同時連繫老師與助教，只要是在情理範圍皆能提供協助，但為確保公平不受理任何繳交期限後之作業相關問題

# Reference Instructions

- **Example of print string：**

```
# print a string on the console interface
li        $v0, 4          # set service code (print_string service) into $v0
la        $a0,string      #load the address of the string to be printed into $a0
syscall                   # print the string
```

# Reference Instructions

- **Example of division：**

```
div     $t1,$t2         # t1 / t2
mflo    $t3             #copy quotient to $t3
mfhi    $t4             #copy remainder to $t4
```

# Reference Instructions

- **Example of multiplication：**

```
mult    $a0, $a1        # a0 * a1
mfhi    $a2             # 32 most significant bits of multiplication to $a2
mflo    $a3             # 32 least significant bits of multiplication to $a3
```