

# Testing

By Hand Computations For Jan 1, 2001		
Variable	Formula	Result
n1	$(14 - 1) / 12$	1
n2	$(1 - 3) + (12 * 1)$	10
n3	$2001 + 4800 - 1$	6,800
n4	$(6,800 / 4) - (6,800 / 100) + (6,800 / 400)$ $= 1,700 - 68 + 17$	1,649
mjd	$1 + (((153 * 10) + 2) / 5) + (365 * 6,800) + 1,649 - 2,432,046$ $= 1 + 306 + 2,482,000 + (-2,430,397)$	<b>51,910</b>

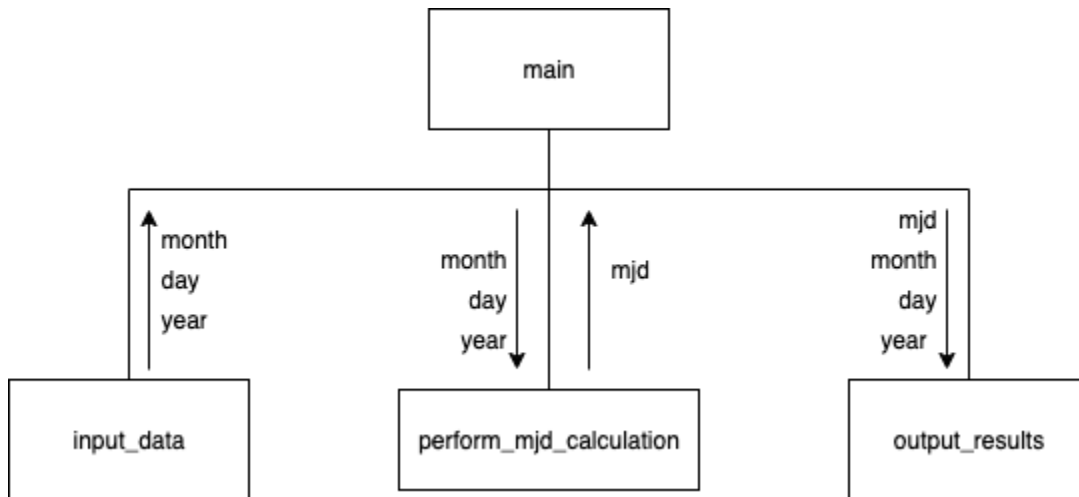
By Hand Computations For June 1, 1972		
Variable	Formula	Result
n1	$(14 - 6) / 12$	0
n2	$(6 - 3) + (12 * 0)$	3
n3	$1972 + 4,800 - 0$	6,772
n4	$(6,772 / 4) - (6,772 / 100) + (6,772 / 400)$ $= 1,693 - 67 + 16$	1,642
mjd	$1 + (((153 * 3) + 2) / 5) + (365 * 6,772) + 1,642 - 2,432,046$ $= 1 + 92 + 2,471,780 + (-2,430,404)$	<b>41,469</b>

# Analysis

IPO Chart				
Variable	Data Type	Input	Processing	Output
month	Integer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
day	Integer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
year	Integer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
n1	Integer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
n2	Integer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
n3	Integer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
n4	Integer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
mjd	Integer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Formulas:</b> { Note: $\text{INT}[a / b]$ means integer quotient only — no remainders or decimals! } <ul style="list-style-type: none"> <li><math>n1 \leftarrow \text{INT}[(14 - \text{month}) / 12]</math></li> <li><math>n2 \leftarrow (\text{month} - 3) + (12 \times n1)</math></li> <li><math>n3 \leftarrow \text{year} + 4800 - n1</math></li> <li><math>n4 \leftarrow \text{INT}[n3 / 4] - \text{INT}[n3 / 100] + \text{INT}[n3 / 400]</math></li> <li><math>\text{mjd} \leftarrow \text{day} + \text{INT}[(153 \times n2 + 2) / 5] + (365 \times n3) + n4 - 2432046</math></li> </ul>				

# Design

## Structure Chart



## Pseudocode:

- **Begin** main()
  - **Declare** month, day, year, mjd as integers
  - **Call** input\_data(month, day, year)
  - **Call** perform\_mjd\_calculation(month, day, year, mjd)
  - **Call** output\_results(month, day, year, mjd)
- **End**
  
- **Begin** input\_data(out month, day, year as integers)
  - **Write** "Enter a month number (Jan=1, Feb=2, etc.): "
  - **Input** month
  - **Write** "Enter a day number (1..31) : "
  - **Input** day
  - **Write** "Enter a year using four digits : "
  - **Input** year
- **End**
  
- **Begin** output\_results(in month, day, year, mjd as integers)
  - **Write** "The MJD for " + month + "/" + day + "/" + year + " is " + mjd
- **End**
  
- **Begin** perform\_mjd\_calculation(in month, day, year as integers, out mjd as integer)
  - **Declare** n1, n2, n3, n4 as integers
  - **Set**
    - { Note:  $\text{INT}[a / b]$  means integer quotient only — no remainders or decimals! }
    - $n1 \leftarrow \text{INT}[(14 - \text{month}) / 12]$
    - $n2 \leftarrow (\text{month} - 3) + (12 \times n1)$
    - $n3 \leftarrow \text{year} + 4800 - n1$
    - $n4 \leftarrow \text{INT}[n3 / 4] - \text{INT}[n3 / 100] + \text{INT}[n3 / 400]$
    - $\text{mjd} \leftarrow \text{day} + \text{INT}[(153 \times n2 + 2) / 5] + (365 \times n3) + n4 - 2432046$
- **End**