Міністерство освіти і науки України

Національний університет «Львівська політехніка»

Кафедра систем штучного інтелекту



**Звіт**

про виконання

**Лабораторних та практичних робіт №2**

***з дисципліни:*** «Мови та парадигми програмування»

***з розділу***: «Лінійні та розгалужені алгоритми. Умовні оператори. Константи. Змінні.»

***Виконала:***

студентка групи ШІ-11

Савчук Аня Григорівна

# **Тема роботи:**

# Лінійні та розгалужені алгоритми. Умовні оператори. Константи та змінні. Теоретичні відомості та практичне застосування.

# **Мета роботи:**

Ознайомитись та навчитись практично застосовувати лінійні та розгалужені алгоритми, умовні оператори, контстанти та змінні. Навчитись правильно їх використовувати та виконати відповідні практичні та лабораторні задання.

# **Теоретичні відомості:**

1. Теоретичні відомості з переліком важливих тем:

* Тема №1: Лінійні та розгалужені алгоритми.
* Тема №2: Умовні оператори.
* Тема №3: Константи, змінні.

1. Індивідуальний план опрацювання теорії:

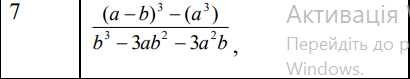
* Тема №1: Лінійні та розгалужені алгоритми.
  + Джерела Інформації
    - Матеріали з ВНС
    - <https://acode.com.ua/urok-46-logichni-operatory-i-abo-ne/>
    - <https://acode.com.ua/urok-67-operatory-umovnogo-rozgaluzhennya-if-else/>
  + Що опрацьовано:
    - Поняття лінійних та розгалужених алгоритмів
    - Елементи лінійних та розгалужених алгоритмів
    - Логічні оператори та умовні вирази
  + Статус: Ознайомлена
  + Початок опрацювання теми: 11.10.23
  + Звершення опрацювання теми: 25.10.23
* Тема №2: Умовні оператори.
  + Джерела Інформації:
    - Матеріали з ВНС
    - <https://acode.com.ua/urok-67-operatory-umovnogo-rozgaluzhennya-if-else/>
    - <https://acode.com.ua/urok-68-operator-switch/>
  + Що опрацьовано:
    - Поняття умовних операторів.
    - Синтаксис операторів if/else та switch/case.
    - Умовні вирази.
  + Статус: Ознайомлена
  + Початок опрацювання теми: 28.09.23
  + Звершення опрацювання теми: 10.10.23
* Тема №3:Константи, змінні.
  + Джерела Інформації:
    - Матеріали з ВНС
    - <https://code-live.ru/post/cpp-variables-and-datatypes/>
    - <https://acode.com.ua/uroki-po-cpp/>
  + Що опрацьовано:
    - Поняття константи та змінної. Оголошенння та ініціалізація констант та змінних. Робота зі зімнними та константами та їх використання
    - Типи даних.
  + Статус: Ознайомлена
  + Початок опрацювання теми: 20.09.23
  + Звершення опрацювання теми: 27.09.23

# **Виконання роботи:**

## **1. Опрацювання завдання та вимог до програм та середовища:**

Завдання №1”**VNS Lab1**”

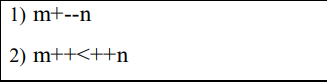
* Варіант завдання:**Task 1v7**





***Image 1: VNS Task 1***

* Деталі завдання: робота зі змінними та виразами; вивест результат даного виразу для типу даних **float** та **double**
* Варіант завдання:**Task 2v7**





***Image 2: VNS Task 2***

* Деталі завдання: змінні, оператори, інкремент та декрменет; вивести результат даних виразів

Завдання №2 “**Algotester Lab1**”

* Варіант завдання: **2**
* Деталі завдання: відпилювати ніжки стола так , щоб стіл стояв паралельно підлозі і не первертався; сказати чи пiсля усiх відпилювань ніжок стiл буде цiлий та паралельний пiдлозi.
* Важливі деталі для врахування в імплементації програми:

hmax >= 2\*hmin

Обмеження:

0 ≤ h1,2,3,4 ≤ 1012

0 ≤ d1,2,3,4 ≤ 1012

Завдання №3”**Class Practice**’

Деталі завдання: Cтворити простий порадник щодо погоди. Користувач вводить поточні погодні умови, а програма видає рекомендації щодо активності на основі погоди. Запропонувати користувачеві ввести поточні погодні умови.Якщо користувач вводить будь-яку іншу умову, запропонуйте йому ввести дійсну умову. Вдповідно до обрнаої погоди виведіть рішення чи брати куртку; рекомендацію щодо активності; рекомендації щодо взуття

* Важливі деталі для врахування в імплементації програми:

if else - щоб вирішити, чи повинен користувач взяти куртку чи ні.

if, else if - щоб надати рекомендацію щодо активності

switch case - для визначення типу рекомендованого взуття.

Завдання №4 “**Self Practice 1**”

* Деталі завдання:

Зараз кожен експерт робить свої прогнози коли закінчиться війна. От і Зеник вирішив, що він нічим не гірший за них.

Зеник готується до всіх можливих розвитків подій, тому вважає, що війна закінчиться лише тоді, коли закінчаться солдати однієї з армій ворожих країн — "р" або "б". Зі своїх джерел, йому стало відомо, що армія першої ворожої країни складається з A солдатів, а другої — з B. Також, для простоти, він вважає, що кожного дня перша ворожа країна втрачатиме рівно C солдатів, а друга — рівно D.

Допоможіть порахувати Зенику через скільки днів закінчиться війна (згідно з його прогнозами).

**Вхідні дані**

У єдиному рядку задано чотири цілих числа через пробіл — A, B, C, D.

**Вихідні дані**

Виведіть єдине ціле число — скільки днів ще днів триватиме війна (згідно з прогнозом Зеника)

* Важливі деталі для врахування в імплементації програми:

Обмеження:

1≤A,B,C,D≤109

A ділиться націло на C, a B — на D

Завдання №4 “**Self Practice 2(Вороги)**”

* Деталі завдання:

Зараз кожен експерт робить свої прогнози коли закінчиться війна. От і Зеник вирішив, що він нічим не гірший за них.

Зеник готується до всіх можливих розвитків подій, тому вважає, що війна закінчиться лише тоді, коли закінчаться солдати обох армій ворожих країн — "р" або "б". Зі своїх джерел, йому стало відомо, що армія першої ворожої країни складається з A солдатів, а другої — з B. Також, для простоти, він вважає, що кожного дня перша ворожа країна втрачатиме рівно C солдатів, а друга — рівно D.

Допоможіть порахувати Зенику через скільки днів закінчиться війна (згідно з його прогнозами).

**Вхідні дані**

У єдиному рядку задано чотири цілих числа через пробіл — A, B, C, D.

**Вихідні дані**

Виведіть єдине ціле число — скільки днів ще днів триватиме війна (згідно з прогнозом Зеника)

* Важливі деталі для врахування в імплементації програми:

Обмеження:

1≤A,B,C,D≤109

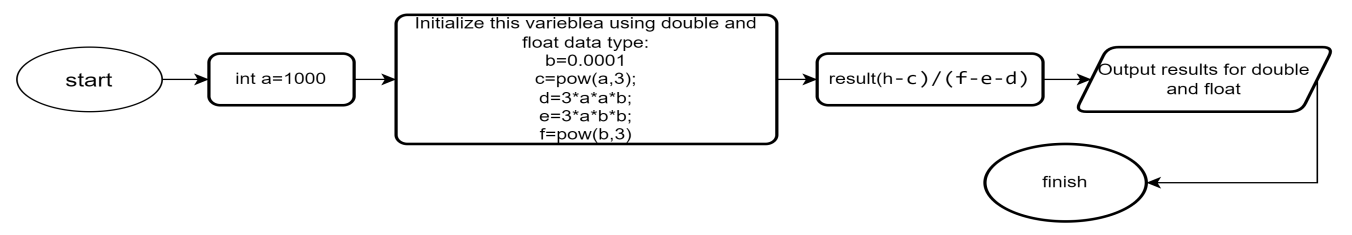
A ділиться націло на C, a B — на D

## **2. Дизайн та планована оцінка часу виконання завдань:**

Програма №1 **VNS Lab1**

* Блок-схеми

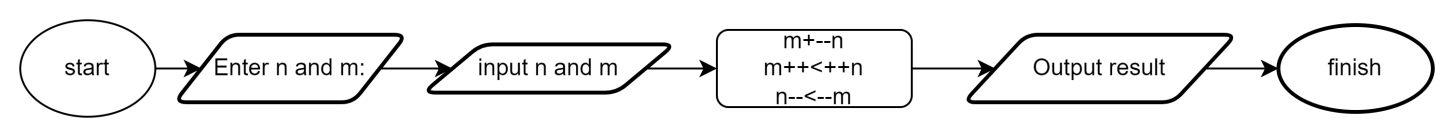
**Task1**



end

***Image 3: Блок-схема до програми VNS Task 1***

**Task2**



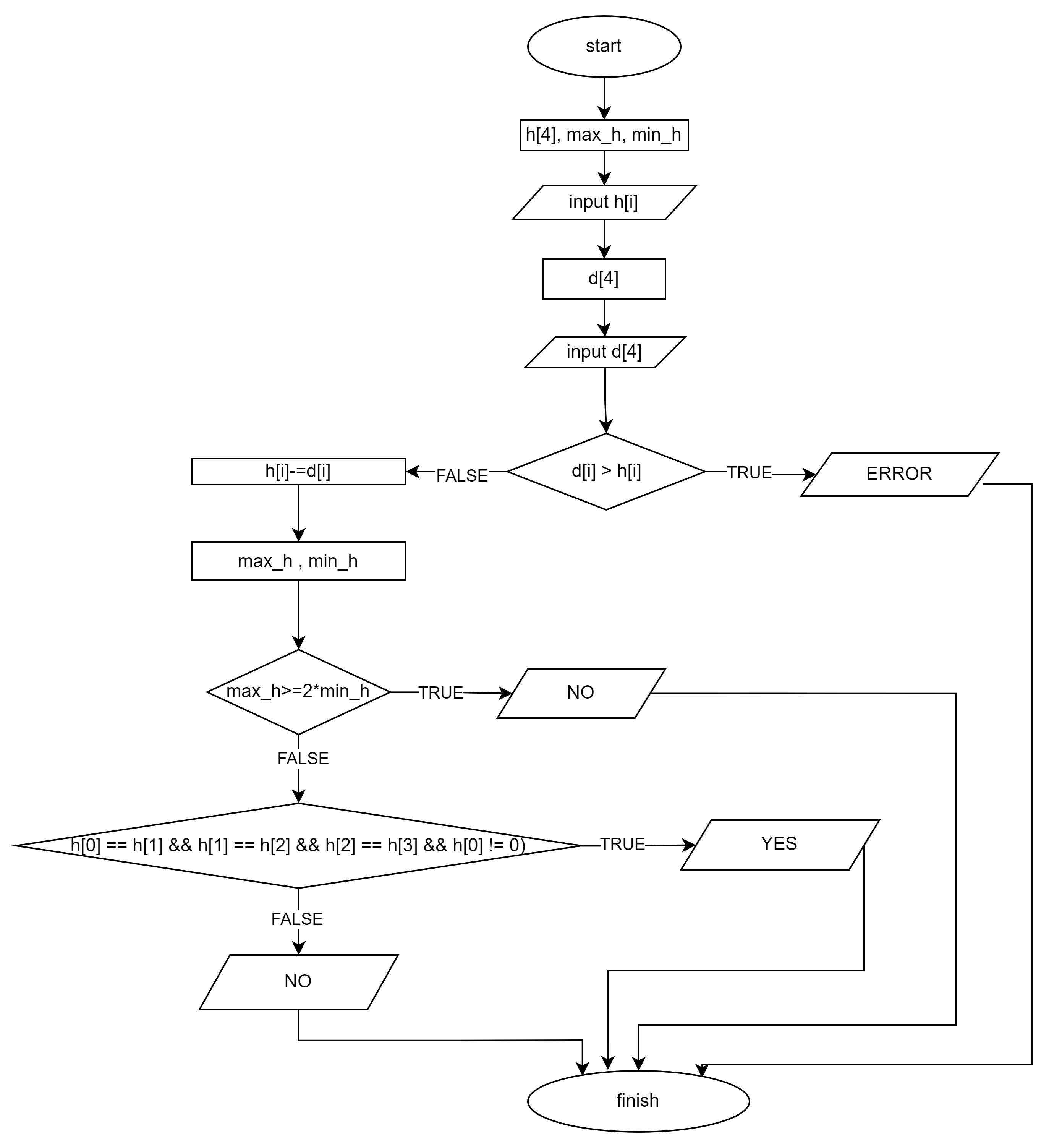
end

***Image 4: Блок-схема до програми VNS Task 2***

* Планований час на реалізацію: 10 + 5 хв

Програма №2 **Algotester Lab1v2**

* Блок-схема



end

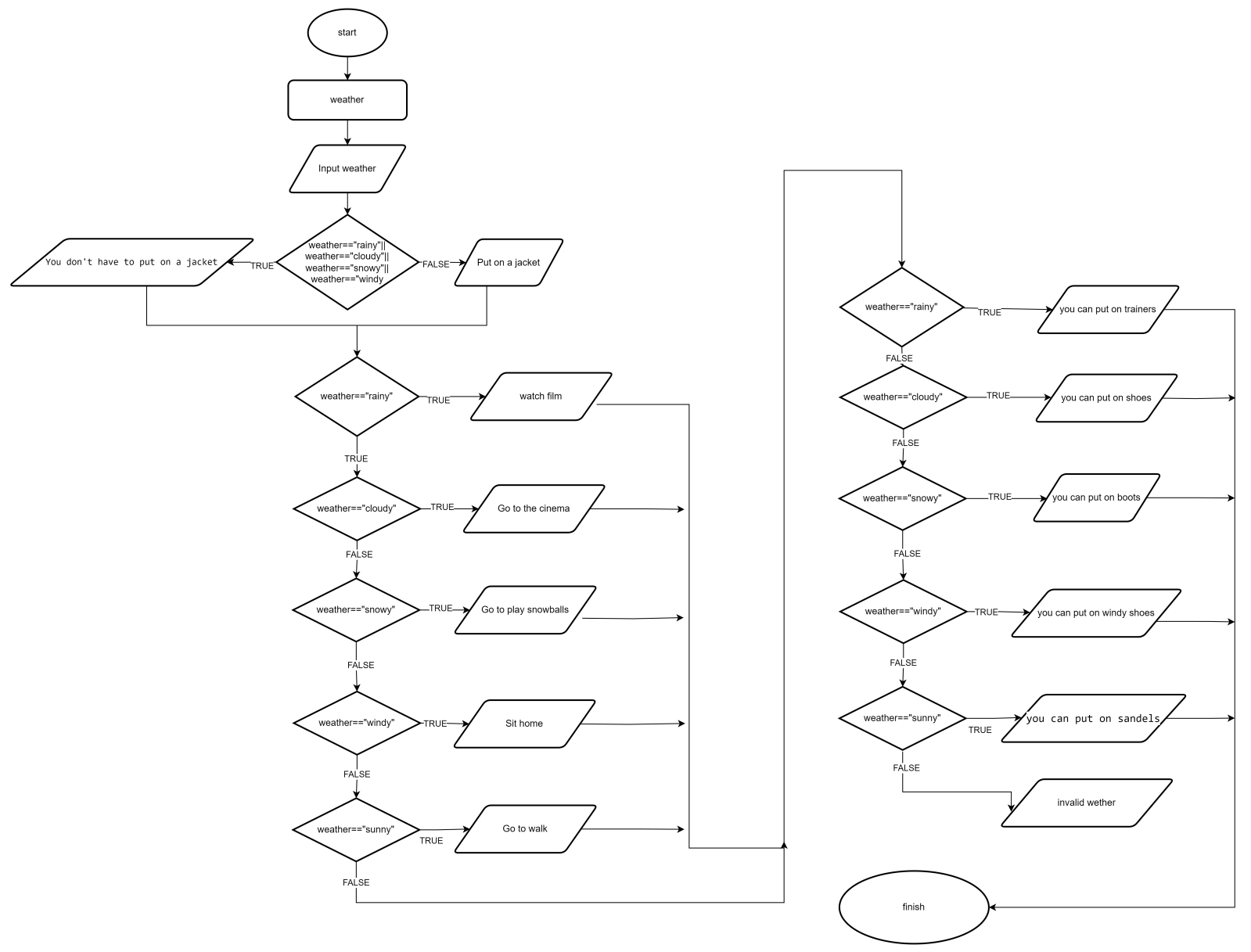
***Image 5: Блок-схема до програми Algotester Lab1***

* Планований час на реалізацію: 17 год

Програма №3 **Class Practice**

* Блок-схема

%3CmxGraphModel%3E%3Croot%3E%3CmxCell%20id%3D%220%22%2F%3E%3CmxCell%20id%3D%221%22%20parent%3D%220%22%2F%3E%3CmxCell%20id%3D%222%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20source%3D%223%22%20target%3D%225%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%223%22%20value%3D%22start%22%20style%3D%22strokeWidth%3D2%3Bhtml%3D1%3Bshape%3Dmxgraph.flowchart.start\_1%3BwhiteSpace%3Dwrap%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22638%22%20y%3D%2280%22%20width%3D%22100%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%224%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20source%3D%225%22%20target%3D%227%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%225%22%20value%3D%22weather%22%20style%3D%22rounded%3D1%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BabsoluteArcSize%3D1%3BarcSize%3D14%3BstrokeWidth%3D2%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22613%22%20y%3D%22170%22%20width%3D%22150%22%20height%3D%2250%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%226%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20source%3D%227%22%20target%3D%2212%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%227%22%20value%3D%22Input%20weather%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22613%22%20y%3D%22252%22%20width%3D%22150%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%228%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20source%3D%2212%22%20target%3D%2218%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%229%22%20value%3D%22FALSE%22%20style%3D%22edgeLabel%3Bhtml%3D1%3Balign%3Dcenter%3BverticalAlign%3Dmiddle%3Bresizable%3D0%3Bpoints%3D%5B%5D%3B%22%20vertex%3D%221%22%20connectable%3D%220%22%20parent%3D%228%22%3E%3CmxGeometry%20x%3D%22-0.2494%22%20y%3D%22-1%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20as%3D%22offset%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2210%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20source%3D%2212%22%20target%3D%2219%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2211%22%20value%3D%22TRUE%22%20style%3D%22edgeLabel%3Bhtml%3D1%3Balign%3Dcenter%3BverticalAlign%3Dmiddle%3Bresizable%3D0%3Bpoints%3D%5B%5D%3B%22%20vertex%3D%221%22%20connectable%3D%220%22%20parent%3D%2210%22%3E%3CmxGeometry%20x%3D%22-0.3237%22%20y%3D%224%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%223%22%20as%3D%22offset%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2212%22%20value%3D%22weather%3D%3D%26quot%3Brainy%26quot%3B%7C%7C%26lt%3Bbr%26gt%3Bweather%3D%3D%26quot%3Bcloudy%26quot%3B%7C%7C%26lt%3Bbr%26gt%3Bweather%3D%3D%26quot%3Bsnowy%26quot%3B%7C%7C%26lt%3Bbr%26gt%3Bweather%3D%3D%26quot%3Bwindy%22%20style%3D%22strokeWidth%3D2%3Bhtml%3D1%3Bshape%3Dmxgraph.flowchart.decision%3BwhiteSpace%3Dwrap%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22598%22%20y%3D%22340%22%20width%3D%22180%22%20height%3D%22120%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2213%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20source%3D%2217%22%20target%3D%2222%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2214%22%20value%3D%22TRUE%22%20style%3D%22edgeLabel%3Bhtml%3D1%3Balign%3Dcenter%3BverticalAlign%3Dmiddle%3Bresizable%3D0%3Bpoints%3D%5B%5D%3B%22%20vertex%3D%221%22%20connectable%3D%220%22%20parent%3D%2213%22%3E%3CmxGeometry%20x%3D%22-0.424%22%20y%3D%22-4%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20as%3D%22offset%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2215%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20source%3D%2217%22%20target%3D%2227%22%20parent%3D%221%22%3E%3CmxGeometry%20re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nnectable%3D%220%22%20parent%3D%2240%22%3E%3CmxGeometry%20x%3D%22-0.3376%22%20y%3D%22-7%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%22-7%22%20y%3D%227%22%20as%3D%22offset%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2242%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D0.5%3BexitY%3D1%3BexitDx%3D0%3BexitDy%3D0%3B%22%20edge%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221240%22%20y%3D%221132.7999755859375%22%20as%3D%22targetPoint%22%2F%3E%3CmxPoint%20x%3D%22699%22%20y%3D%221149.2%22%20as%3D%22sourcePoint%22%2F%3E%3CArray%20as%3D%22points%22%3E%3CmxPoint%20x%3D%22699%22%20y%3D%221210%22%2F%3E%3CmxPoint%20x%3D%221240%22%20y%3D%221210%22%2F%3E%3C%2FArray%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2243%22%20value%3D%22FALSE%22%20style%3D%22edgeLabel%3Bhtml%3D1%3Balign%3Dcenter%3BverticalAlign%3Dmiddle%3Bresizable%3D0%3Bpoints%3D%5B%5D%3B%22%20vertex%3D%221%22%20connectable%3D%220%22%20parent%3D%2242%22%3E%3CmxGeometry%20x%3D%22-0.8975%22%20y%3D%22-1%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20y%3D%221%22%20as%3D%22offset%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2244%22%20value%3D%22weather%3D%3D%26quot%3Bsunny%26quot%3B%22%20style%3D%22rhombus%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BstrokeWidth%3D2%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22619%22%20y%3D%221078%22%20width%3D%22160%22%20height%3D%2280%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2245%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.75%3BexitDx%3D0%3BexitDy%3D0%3B%22%20edge%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221113%22%20y%3D%22849.6153846153845%22%20as%3D%22targetPoint%22%2F%3E%3CmxPoint%20x%3D%22984.843049327354%22%20y%3D%22850.3587443946185%22%20as%3D%22sourcePoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2246%22%20value%3D%22%26lt%3Bp%20class%3D%26quot%3BMsoNormal%26quot%3B%26gt%3BGo%20to%20play%20snowballs%26lt%3B%2Fp%26gt%3B%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22822%22%20y%3D%22810%22%20width%3D%22182%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2247%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.5%3BexitDx%3D0%3BexitDy%3D0%3B%22%20edge%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221115%22%20y%3D%22983.4615384615383%22%20as%3D%22targetPoint%22%2F%3E%3CmxPoint%20x%3D%22973.0699999999997%22%20y%3D%22984.0000000000002%22%20as%3D%22sourcePoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2248%22%20value%3D%22Sit%20home%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22821%22%20y%3D%22954%22%20width%3D%22182%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2249%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.5%3BexitDx%3D0%3BexitDy%3D0%3B%22%20edge%3D%221%22%20source%3D%2250%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221114%22%20y%3D%221117.3076923076924%22%20as%3D%22targetPoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2250%22%20value%3D%22%26lt%3Bp%20class%3D%26quot%3BMsoNormal%26quot%3B%26gt%3BGo%20to%20walk%26lt%3B%2Fp%26gt%3B%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22822%22%20y%3D%221087%22%20width%3D%22182%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2251%22%20value%3D%22%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3B%22%20edge%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221467%22%20y%3D%22458%22%20as%3D%22sourcePoint%22%2F%3E%3CmxPoint%20x%3D%221579.9299999999998%22%20y%3D%22460%22%20as%3D%22targetPoint%22%2F%3E%3CArray%20as%3D%22points%22%3E%3CmxPoint%20x%3D%221524%22%20y%3D%22459%22%2F%3E%3CmxPoint%20x%3D%221580%22%20y%3D%22460%22%2F%3E%3C%2FArray%3E%3C%2FmxGeometry%3E%3C%2Fmx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FArray%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2277%22%20value%3D%22FALSE%22%20style%3D%22edgeLabel%3Bhtml%3D1%3Balign%3Dcenter%3BverticalAlign%3Dmiddle%3Bresizable%3D0%3Bpoints%3D%5B%5D%3B%22%20vertex%3D%221%22%20connectable%3D%220%22%20parent%3D%2276%22%3E%3CmxGeometry%20x%3D%22-0.8094%22%20y%3D%224%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20as%3D%22offset%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2278%22%20value%3D%22weather%3D%3D%26quot%3Bsunny%26quot%3B%22%20style%3D%22rhombus%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BstrokeWidth%3D2%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%221310%22%20y%3D%22937%22%20width%3D%22160%22%20height%3D%2280%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2279%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.5%3BexitDx%3D0%3BexitDy%3D0%3B%22%20edge%3D%221%22%20source%3D%2280%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221810%22%20y%3D%22698.3333333333335%22%20as%3D%22targetPoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2280%22%20value%3D%22%26lt%3Bp%20class%3D%26quot%3BMsoNormal%26quot%3B%26gt%3Byou%20can%20put%20on%20boots%26lt%3B%2Fp%26gt%3B%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%221554%22%20y%3D%22668%22%20width%3D%22163%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2281%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.75%3BexitDx%3D0%3BexitDy%3D0%3B%22%20edge%3D%221%22%20source%3D%2282%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221810%22%20y%3D%22855%22%20as%3D%22targetPoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2282%22%20value%3D%22%26lt%3Bp%20class%3D%26quot%3BMsoNormal%26quot%3B%26gt%3Byou%20can%20put%20on%20windy%20shoes%26lt%3B%2Fp%26gt%3B%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%221526%22%20y%3D%22814%22%20width%3D%22218%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2283%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.5%3BexitDx%3D0%3BexitDy%3D0%3B%22%20edge%3D%221%22%20source%3D%2284%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221810%22%20y%3D%22976.6666666666667%22%20as%3D%22targetPoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2284%22%20value%3D%22%26lt%3Bdiv%20style%3D%26quot%3Bfont-family%3A%20Consolas%2C%20%26amp%3Bquot%3BCourier%20New%26amp%3Bquot%3B%2C%20monospace%3B%20font-size%3A%2014px%3B%20line-height%3A%2019px%3B%26quot%3B%26gt%3B%26lt%3Bspan%20style%3D%26quot%3Bbackground-color%3A%20rgb(255%2C%20255%2C%20255)%3B%26quot%3B%26gt%3Byou%20can%20put%20on%20sandels%26lt%3B%2Fspan%26gt%3B%26lt%3B%2Fdiv%26gt%3B%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%221513%22%20y%3D%22947%22%20width%3D%22237%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2285%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.5%3BexitDx%3D0%3BexitDy%3D0%3BentryX%3D0.5%3BentryY%3D0%3BentryDx%3D0%3BentryDy%3D0%3BentryPerimeter%3D0%3B%22%20edge%3D%221%22%20target%3D%2255%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%221003.0000000000001%22%20y%3D%22580%22%20as%3D%22sourcePoint%22%2F%3E%3CmxPoint%20x%3D%221377%22%20y%3D%22403%22%20as%3D%22targetPoint%22%2F%3E%3CArray%20as%3D%22points%22%3E%3CmxPoint%20x%3D%221120%22%20y%3D%22580%22%2F%3E%3CmxPoint%20x%3D%221120%22%20y%3D%221141%22%2F%3E%3CmxPoint%20x%3D%221240%22%20y%3D%221141%22%2F%3E%3CmxPoint%20x%3D%221240%22%20y%3D%22284%22%2F%3E%3CmxPoint%20x%3D%221389%22%20y%3D%22284%22%2F%3E%3C%2FArray%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2286%22%20value%3D%22finish%22%20style%3D%22strokeWidth%3D2%3Bhtml%3D1%3Bshape%3Dmxgraph.flowchart.start\_1%3BwhiteSpace%3Dwrap%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%221310%22%20y%3D%221170%22%20width%3D%22189%22%20height%3D%2292%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2287%22%20style%3D%22edgeStyle%3DorthogonalEdgeStyle%3Brounded%3D0%3BorthogonalLoop%3D1%3BjettySize%3Dauto%3Bhtml%3D1%3BexitX%3D1%3BexitY%3D0.5%3BexitDx%3D0%3BexitDy%3D0%3BentryX%3D1%3BentryY%3D0.5%3BentryDx%3D0%3BentryDy%3D0%3BentryPerimeter%3D0%3B%22%20edge%3D%221%22%20source%3D%2256%22%20target%3D%2286%22%20parent%3D%221%22%3E%3CmxGeometry%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CArray%20as%3D%22points%22%3E%3CmxPoint%20x%3D%221810%22%20y%3D%22460%22%2F%3E%3CmxPoint%20x%3D%221810%22%20y%3D%221216%22%2F%3E%3C%2FArray%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2288%22%20value%3D%22%26lt%3Bp%20class%3D%26quot%3BMsoNormal%26quot%3B%26gt%3Binvalid%20wether%26lt%3B%2Fp%26gt%3B%22%20style%3D%22shape%3Dparallelogram%3Bhtml%3D1%3BstrokeWidth%3D2%3Bperimeter%3DparallelogramPerimeter%3BwhiteSpace%3Dwrap%3Brounded%3D1%3BarcSize%3D12%3Bsize%3D0.23%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%221513%22%20y%3D%221054%22%20width%3D%22220%22%20height%3D%2260%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3C%2Froot%3E%3C%2FmxGraphModel%3



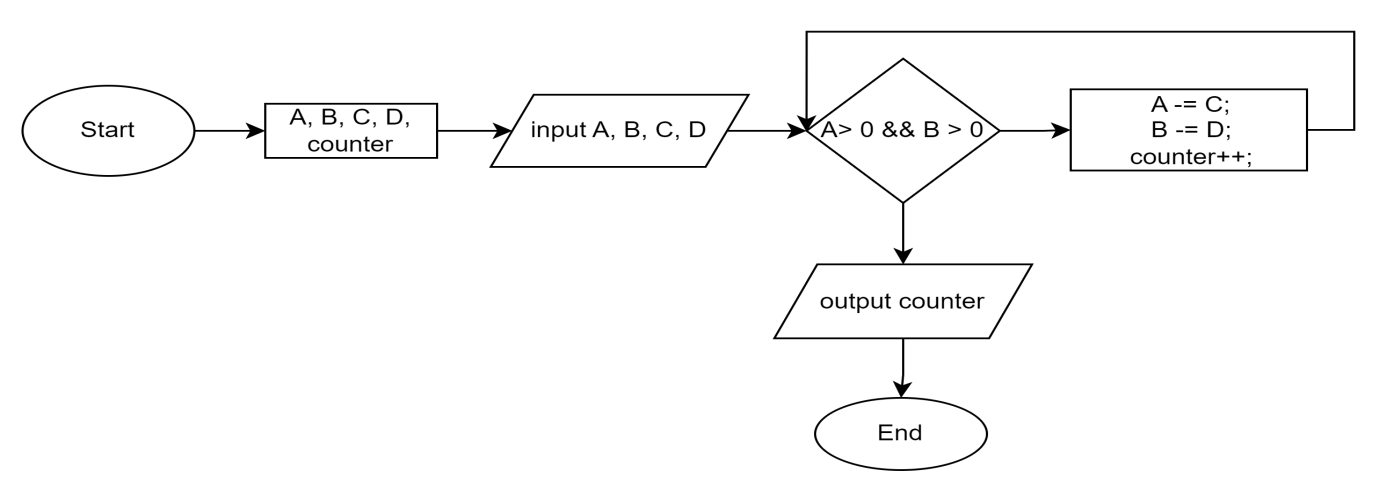
end

***Image 6:Блок-схема до програми Class Practice***

* Планований час на реалізацію: 30 хв

Програма №4 **Self Practice 1**

* Блок-схема



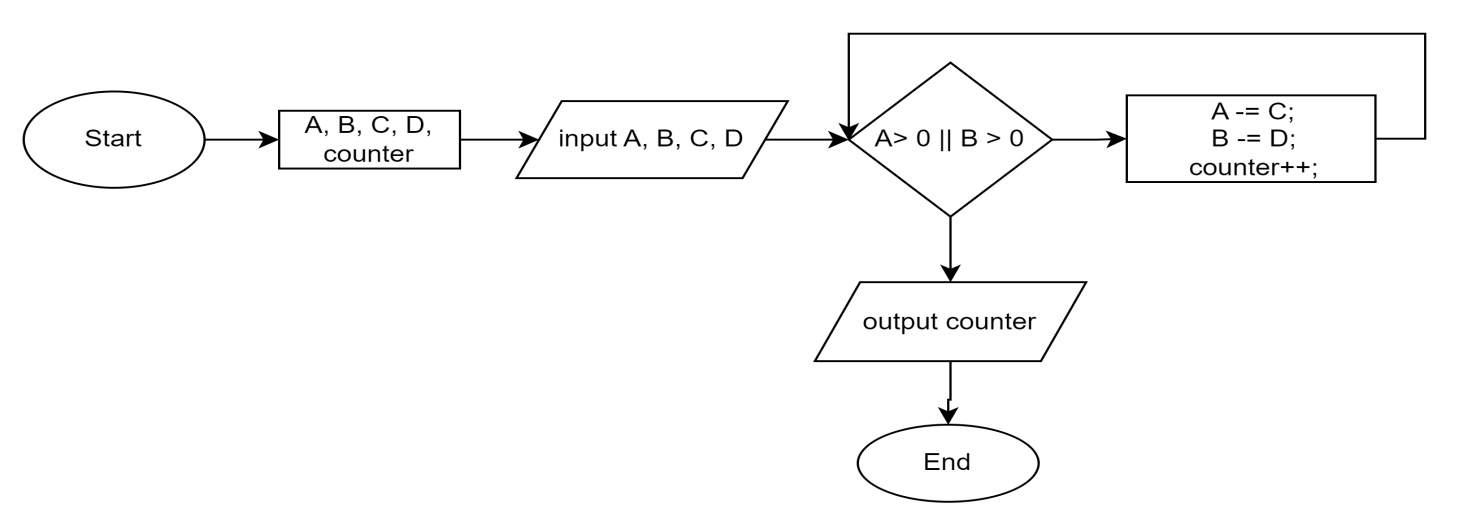
end

***Image 7: Блок-схема до програми Self Practice 1***

* Планований час на реалізацію: 10 хв

Програма №5 **Self Practice 2**

* Блок-схема



***Image 8: Блок-схема до програми Self Practice 2***

## **3. Код програм з посиланням на зовнішні ресурси:**

Завдання №1**VNS Lab1**

Посилання на файл програми у пул-запиті GitHub

#include<iostream>

#include<math.h>

using namespace std;

int main(){

    int a\_d=1000;

    double b\_d=0.0001;

    double d\_d=3\*a\_d\*a\_d\*b\_d;

    int c\_d=pow(a\_d,3);

    double e\_d=3\*a\_d\*b\_d\*b\_d;

    double f\_d=pow(b\_d,3);

    double h\_d=pow((a\_d-b\_d),3);

    double result\_d=(h\_d-c\_d)/(f\_d-e\_d-d\_d);

    int a\_f=1000;

    float b\_f=0.0001;

    float d\_f=3\*a\_f\*a\_f\*b\_f;

    int c\_f=pow(a\_f,3);

    float e\_f=3\*a\_f\*b\_f\*b\_f;

    float f\_f=pow(b\_f,3);

    float h\_f=pow((a\_f-b\_f),3);

float result\_f=(h\_f-c\_f)/(f\_f-e\_f-d\_f);

cout<<result\_d<<endl;

    cout<<result\_f;

}

***Insert 1: Код до програми VNS Lab1 Task1***

Посилання на файл програми у пул-запиті GitHub

#include <iostream>

using namespace std;

int main() {

    int m, n;

    cout << "Enter n and m: ";

    cin >> m >> n;

    cout << boolalpha;

    cout << "m+--n: " << m+--n << endl;

    cout << "m++<++n: " << (m++<++n) << endl;

    cout << "n--<--m: " << (n--<--m) << endl;

    return 0;

}

***Insert 2: Код до програми VNS Lab1 Task2***

Завдання №2 **Algotester Lab1v2**

Посилання на файл програми у пул-запиті GitHub

#include <iostream>

using namespace std;

int main() {

    long long h[4], max\_h, min\_h;

    for(int i = 0; i < 4; i++)

        cin >> h[i];

    long long d[4];

    for(int i = 0; i < 4; i++)

        cin >> d[i];

    for(int i = 0; i < 4; i++) {

        if(d[i] > h[i]) {

            cout << "ERROR" << endl;

            return 0;

        }

    }

    for(int i = 0; i < 4; i++) {

        h[i] -= d[i];

        max\_h = h[0], min\_h = h[0];

        for(int j = 0; j < 4; j++) {

            if(h[j] > max\_h)

                 max\_h = h[j];

            if(h[j] < min\_h)

                min\_h = h[j];

        }

        if(max\_h >= 2 \* min\_h) {

            cout << "NO" << endl;

            return 0;

        }

    }

    if(h[0] == h[1] && h[1] == h[2] && h[2] == h[3] && h[0] != 0) {

        cout << "YES" << endl;

    } else{

        cout << "NO" << endl;

    }

    return 0;

}

***Insert 3: Код до програми Algotester Lab1v2***

Програма успішно виконана та пройшла перевірку на алготестері

Завдання №3 **Class Practice**

Посилання на файл програми у пул-запиті GitHub

#include<iostream>

#include<string>

using namespace std;

int main(){

    string weather;

    cout<<"Please enter weather: ";

    cin>>weather;

    if (weather=="rainy"||weather=="cloudy"||weather=="snowy"||weather=="windy"){

        cout<<"Put on a jacket"<<endl;

    }

    else{

        cout<<"You don't have to put on a jacket"<<endl;

    }

    if(weather=="rainy"){

        cout<<"watch film"<<endl;

    }

    else if(weather=="clody"){

        cout<<"Go to the cinema"<<endl;

    }

    else if(weather=="snowy"){

        cout<<"Go to play snowballs"<<endl;

    }

    else if(weather=="windy"){

        cout<<"sit home"<<endl;

    }

    else if(weather=="sunny"){

        cout<<"Go to walk"<<endl;

    }

    switch(weather.at(0)){

        case 's':

            if(weather.at(1)=='u')

                cout<<"you can put on sandels"<<endl;

            else

                cout<<"you can put on boots"<<endl;

            break;

        case 'r':

            cout<<"you can put on trainers"<<endl;

            break;

        case 'c':

            cout<<"you can put on shoes"<<endl;

            break;

        case 'w':

            cout<<"you can put on windy shoes"<<endl;

            break;

        default :

            cout<<"invalid wether"<<endl;

    }

    return 0;

}

***Insert 4: Код до програми Class Practice***

Програма успішно виконана та працює відповідно до всіх вимог поставлених у задачі

Завдання №4 **Self Practice 1**

Посилання на файл програми у пул-запиті GitHub

#include <iostream>

int main()

{

    long int A, B, C, D;

    std::cin >> A >> B >> C >> D;

    long int counter = 0;

    while (A > 0 && B > 0)

    {

        A -= C;

        B -= D;

        counter++;

    }

    std::cout << counter;

}

***Insert 5: Код до програми Self Practice 1***

Програма успішно виконана та працює відповідно до всіх вимог поставлених у задачі

Завдання №5 **Self Practice 2**

Посилання на файл програми у пул-запиті GitHub

#include <iostream>

int main()

{

    long int A, B, C, D;

    std::cin >> A >> B >> C >> D;

    long int counter = 0;

    while (A > 0 || B > 0)

    {

        A -= C;

        B -= D;

        counter++;

    }

    std::cout << counter;

}

***Insert 6: Код до програми Self Practice 2***

## **4. Результати виконання завдань, тестування та фактично затрачений час:**

Завдання №1**VNS Lab1**

**Task1**

PS D:\Student\Term\_1\MPP\Epic\_2> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.17.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-f3riokak.b2q' '--stdout=Microsoft-MIEngine-Out-3iaka5xx.dxy' '--stderr=Microsoft-MIEngine-Error-wddztnvv.dls' '--pid=Microsoft-MIEngine-Pid-0ne5sn3x.jp4' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

1

1.28

***Insert 7: Результати виконання програми VNS Lab1 Task1***

Програма успішно виконана та виведено результати для типу даних double та float

Час затрачений на виконання завдання: 10 хв

**Task2**

PS D:\Student\Term\_1\MPP\Epic\_2> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.17.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-mr0sa4dj.gbz' '--stdout=Microsoft-MIEngine-Out-cqvt0afv.bed' '--stderr=Microsoft-MIEngine-Error-i1ycvs0p.3lm' '--pid=Microsoft-MIEngine-Pid-gec0bawp.rdm' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

Enter n and m: 5 10

m+--n: 14

m++<++n: true

n--<--m: false

***Insert 8: Результати виконання програми VNS Lab1 Task2***

Програма успішно виконана та виведено результат відповідно до умови

Час затрачений на виконання завдання: 5 хв

Завдання №2 **Algotester Lab1v2**

PS C:\Users\annas> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.18.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-jbrjtroz.buz' '--stdout=Microsoft-MIEngine-Out-t50532f5.san' '--stderr=Microsoft-MIEngine-Error-e0kohkbj.5vv' '--pid=Microsoft-MIEngine-Pid-abahmhtb.wyr' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

10 10 10 10

5

1

1

1

NO

PS C:\Users\annas> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.18.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-0t5fmwe4.gwh' '--stdout=Microsoft-MIEngine-Out-uy0pmtnu.zxx' '--stderr=Microsoft-MIEngine-Error-xeyhvnss.xg2' '--pid=Microsoft-MIEngine-Pid-ljpd54z2.2v4' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

10 10 10 10

1

11

1

1

ERROR

PS C:\Users\annas> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.18.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-rov5sl1k.yeu' '--stdout=Microsoft-MIEngine-Out-1filzmw2.ghv' '--stderr=Microsoft-MIEngine-Error-2iia4fhi.ucu' '--pid=Microsoft-MIEngine-Pid-vrkdafox.kwz' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

10 10 10 10

5

5

5

5

NO

PS C:\Users\annas> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.18.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-kruqwymb.god' '--stdout=Microsoft-MIEngine-Out-1siet3hm.ny5' '--stderr=Microsoft-MIEngine-Error-4gs2tgu5.e2q' '--pid=Microsoft-MIEngine-Pid-bhswvk0j.a03' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

10 10 10 10

3

3

3

3

YES

PS C:\Users\annas> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.18.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-4u2tijcn.tdw' '--stdout=Microsoft-MIEngine-Out-cjvres3r.ien' '--stderr=Microsoft-MIEngine-Error-2obu1j5h.r0c' '--pid=Microsoft-MIEngine-Pid-gjdgzxsv.t35' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

10 10 10 10

5

5

11

5

ERROR

***Insert 9: Результати виконання програми Algotester Lab1v2***

Програма успішно виконана та пройшла перевірку на алготестері



***Image 9: Задачу прийнято на алготестері***

Час затрачений на виконання завдання:17 год

Завдання №3 **Class Practice**

PS D:\Student\Term\_1\MPP\Epic\_2> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.17.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-ispwb2er.n4e' '--stdout=Microsoft-MIEngine-Out-fd0dxkxh.q5c' '--stderr=Microsoft-MIEngine-Error-122lq5he.b4t' '--pid=Microsoft-MIEngine-Pid-04the3sl.zkc' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

Please enter weather: sunny

You don't have to put on a jacket

Go to walk

you can put on sandels

PS D:\Student\Term\_1\MPP\Epic\_2> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.17.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-woah0es2.w5l' '--stdout=Microsoft-MIEngine-Out-ws0hjklj.dva' '--stderr=Microsoft-MIEngine-Error-zeqbgnuz.atv' '--pid=Microsoft-MIEngine-Pid-brkdm2bm.gum' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

Please enter weather: snowy

Put on a jacket

Go to play snowballs

you can put on boots

***Insert 10: Pезультаи програми Class Practice***

Програма успішно виконана та працює відповідно до всіх вимог поставлених у задачі

Час затрачений на виконання завдання: 30 хв

Завдання №4 **Self Practice 1**

PS D:\Student\Term\_1\MPP\Epic\_2> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.17.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-55oj1ln3.lax' '--stdout=Microsoft-MIEngine-Out-bhnuqt1f.nma' '--stderr=Microsoft-MIEngine-Error-3ocd4dls.alo' '--pid=Microsoft-MIEngine-Pid-vzfffwa1.4ux' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

7

4

1

2

2

***Insert 11: Pезультати програми Self Practice 1***

Програма успішно виконана та працює відповідно до всіх вимог поставлених у задачі

Час затрачений на виконання завдання: 10 хв

Завдання №5 **Self Practice 2**

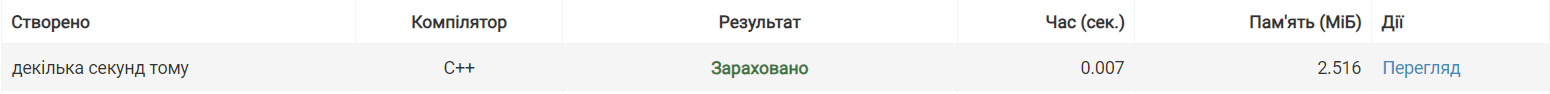
PS C:\Users\annas> & 'c:\Users\annas\.vscode\extensions\ms-vscode.cpptools-1.18.5-win32-x64\debugAdapters\bin\WindowsDebugLauncher.exe' '--stdin=Microsoft-MIEngine-In-uzkgpzav.xmj' '--stdout=Microsoft-MIEngine-Out-soxganyk.p2p' '--stderr=Microsoft-MIEngine-Error-j41r2ccn.lgg' '--pid=Microsoft-MIEngine-Pid-1qsmlqga.xpe' '--dbgExe=C:\msys64\ucrt64\bin\gdb.exe' '--interpreter=mi'

7 4 1 2

7

***Insert 12: Pезультати програми Self Practice 2***

Програма успішно виконана та працює відповідно до всіх вимог поставлених у задачі і пройшла перевірку на алготестері



***Image 10:Задачу прийнято на алготестері***

Час затрачений на виконання завдання: 10 хв

# **Висновки:**

Вивчаючи дану тему я засвоїла теоретичні занння про лінійні та розгалужені алгоритми, умовні оператори, змінні та константи. Добре опрацювавши тему при вокинання практичних та лабораторних робіт я змогла вільно використати свої знання. Добре засвоївши на практиці використання змінних та констнат, а також умовних операторів зможу надалі використовувати їх для вирішення задач.