

Week 3

EMT 101 – Engineering Programming

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Overview

- We have learned the basics of programming.
- Understand C++ library, data type, basic memory allocation, etc.
- Use of Main program
- Now need to understand control structures for decision making procedures in the program

Case Study 1

- How much money you need to survive in Desasiswa ?
- Where to start?
- Use of Flow Chart

Decision Making Within a Program

- Consider a student's budget control living in USM

- `If(income >= expenses)`

```
{  
    cout << "OK" << endl;  
}
```

else

```
{  
    cout << "Please reduce your expenses!" << endl;  
}
```

Math Example

```
int main()
{ double r;
  ....
  if(r >= 0)
  {
    double root = sqrt(r);
  }
  .....
  return 0;

}
```

To use '=' or '=='

- Recall that 'x=y' means you are assigning the value y into x

- If(income == expenses)

```
{  
    cout << "OK" << endl;  
}
```

else

```
{  
    cout << "Please reduce your expenses!" << endl;  
}
```

Multiple Choices

- Consider a program that asks a user to specify a coin and its quantities:
- 1 sen, 5 sen, 10 sen, 20 sen, 50 sen
- The computer program is supposed to determine the total RM value of the coins

Coins Program

```
#include <iostream>
#include <string>
#include <conio.h>
using namespace std;

int main()
{
    int N; double value=0;
    string coin_type;

    cout << "enter coin type: " << endl;
    getline(cin,coin_type);
    cout << "Enter the number of coins: " << endl;
    cin >> N;

    if(coin_type == "1 sen")
        value = N*0.01;
    else if (coin_type == "5 sen")
        value = N*0.05;
    else if (coin_type == "10 sen")
        value = N*0.10;
    else if (coin_type == "20 sen")
        value = N*0.20;
    else if (coin_type == "50 sen")
        value = N*0.5;
    else
        cout << coin_type << " is not a valid coin" << endl;

    cout << "Coins value is RM  " << value << endl;

    getch();
    return 0;
} // end of program body
```


Nested Branches

- Deployed as a way to perform more complex decision making procedure
- Example USM students performance
- Need to select if student is from (1) Matriculation OR (2) STPM
- Define performance criteria as $A=4.0$, $B=3.0$, $C=2.0$, else fail

Exercises

- Write a program
 - i) to input the origin of the students (STPM/Matriculation)
 - ii) and to determine the GPA of the students based on their grades.

- Write a program to
 - i) Enter your total monthly income
 - ii) Enter your type of expenses and cost for a month
 - iii) Determine whether you can survive in Desasiswa

Homework 1

- Refer to assignment section in website