Q1

1. The result of a logical expression cannot be assigned to an int variable. (**false**)
2. In a one-way selection, if a semicolon is placed after the expression in an if statement as if (score >= 60);, the expression in the if statements is always true (**true**)
3. Every if statement must have a corresponding else. (**false**)
4. The expression in the if statement: always evaluates to true (**true**)
5. The expression: **(ch >= 'A' && ch <= 'Z')** evaluates to false if either **ch < 'A'** or **ch >= 'Z'** (**false**)
6. suppose the input is **5.** The output of the code is: Num is Zero (**false**)
7. The expression **!(x > 0)** is true only if x is a negative number (**true**)
8. In C++, both **!** And **!=** are logical operators (**false**)
9. The execution of a break statement in a switch statement immediately exits the switch structure (**true**)
10. The expression in a switch statement should evaluate to a value of the simple data type (**true**)

Q2

- Evaluate the following expressions:

```
a. 5 + 6 == 3 + 7 // false
b. 2 * 6 – 4 >= 9 – 1 // true
c. 'U' >= 't' // false
d. 'A' <= 'a' // true
e. '#' <= '+' // true
f. 6.28 / 3 < 3 – 1.2 // false
```

- Suppose that x, y and z are int variables, and **x = 10, y = 15**, and **z = 20.** Determine whether the following expressions evaluates to true or false.

```
a. !(x > 10) // true
b. x <= 5 || y < 15 // true
c. (x != 5) && (y != z) // true
d. x >= z || (x + y >= z) // true
e. (x <= y – 2) && (y >= z) || (z –
2 != 20) // true
```

- Suppose that **x, y, z** and **w** are int variables and **x = 3, y = 4, z = 7,** and **w = 1**. what is the output fo the following stataements?

```
cout << "x == y: " << (x == y) << endl; // x == y: false
cout << "x != z: " << (x != z) << endl; // x != z: true
cout << "y == z – 3: " << (y == z – 3); //  y == z - 3: true
cout << "!(z > w): " << !(z > w) << endl; // !(z > w): false
cout << "x + y < z: " << (x + y < z) << endl; // x + y < z: false
```

- Which of the following are relational operators?

  a) <
  b) <=
  c) =
  d) =!
  e) <>

  Answer: b, d

- Which of the following are logical (Boolean) operators?
  a) !
  b) !=
  c) $$

  Answer: a

- Correct the following code so that it prints the correct message:

```
If (score >= 60)
cout << "You pass." << endl;
else;
cout << "You fail." << endl;
```

  Answer:

```
if (score >= 60)
cout << "You pass." << endl;
else
cout << "You fail." << endl;
```

- Write a C++ statement that output Male if the gender is ‘M’, Femal if the gender is ‘F’ and invalid gender otherwise

  Answer:

```
char gender = 'M';
switch (gender){
        case 'M': {
                cout << "Male" << endl;
                } break;
        case 'F': {
                cout << "Female" << endl;
                } break;
        default: {
                cout << "Invalid" << endl;
                } break;
        }
```

- What is the output of the following program ?

```
int myNum = 10;
int yourNum = 30;
if (yourNum % myNum == 3){
yourNum = 3;
myNum = 1;
}
else if (yourNum % myNum == 2) {
yourNum = 2;
myNum = 2;
}
else {
yourNum = 1;
myNum = 3;
}
cout << myNum << " " << yourNum << endl;
```

Answer: 3 1

- What is the output of the program in the previous exercise, if **myNum = 5** and **yourNum = 12**?

Answer: 2 2

- What is the output of the previous exercise if **myNum = 30** and **yourNum = 33**?

Answer: 1 3

- Suppose that score is an int variable. Consider the following if statement
  a) if (score == 70) cout << "Grade is C" << endl;
  b) if (score = 70) cout << "Grade is C" << endl;

  - What is the output in a and b if the value of score is 70? What is the value of the score after the if statement executes?
  - What is the output in a and b if the value of score is 80? What is the value of the score after the if statement executes?

Answer:

- **a:**

  Grade is C
  Grade is C

  the value of score is 70

- **b:**
  Grade is C
  the value of score is 80

- Rewrite the following expressions using the conditional operator (?:) assume that all variables are declared properly

a) if (x >= y)
   z = x – y;
   else
   z = y – x;
b) if (hours >= 40.0)
   wages = 40 * 7.50 + 1.5 * 7.5 * (hours – 40);
   else
   wages = hours * 7.50;
c) if (score >= 60)
   str = “Pass”;
   else
   str = “Fail”;

Answers:

a) x >= y ? (z = x – y) : (z = y – x);
b) hours >= 40.0 ? (wages = 40 * 7.50 + 1.5 * 7.5 * (hours – 40)) : (wages = hours * 7.50);
c) score >= 60 ? str = “Pass” : str = “Fail”;

- Rewrite the following expressions using an if...else statements. (Assume that the variables are declared properly)

a) (x < 5) ? y = 10 : y = 20;
b) (fuel >= 10) ? drive = 150 : drive = 30
c) (booksBought >= 3) ? discount = 0.15 : discount = 0.0;

Answers:

a) if (x < 5){
   y = 10; }
   else{
   y = 20; }

b) if (fuel >= 10){
   drive = 150; }
   else {
   drive = 30; }

c) if (booksBought >= 3) {
   discount = 0.15; }

```
else {
discount = 0.0; }
```

- Suppose that you have the following conditional expression. (Assume variable are declared)

  (0 < backyard && backyard <= 5000) ? fertilizingCharges = 40.00 : fertilizingCharges = 40.00 + (backyard – 5000) * 0.01;

  a) What is the value of fertilizingCharges if the value of the backyard is 3000
  b) What is the value of fertilizingCharges if the value of the backyard is 5000
  c) What is the value of fertilizingCharges if the value of the backyard is 6500

  Answers:

  a) fertilizingCharges = 40.00
  b) fertilizingCharges = 40.00
  c) fertilizingCharges = 55.00

- State whether the following are valid switch statements. If not, explain why. Assume that **n** and **digit** are int variables

```
/*a.*/ switch(n <= 2){
case 0: cout << "Draw." << endl; break;
case 1: cout << "Win." << endl; break;
case 2: cout << "Lose." << endl; break;
}
/*b.*/ switch(digit / 4){
case 0,
case 1: cout << "low." << endl; break;
case 1, case 2: cout << "middle." << endl; break;
case 3: cout << "high." << endl;
}

/*c*/switch(n % 6){
case 1:
case 2:
case 3:
case 4:
case 5:
cout << n;
break;
case 0:
cout << endl;
break;
}

/*d*/ switch(n % 10){
case 2:
case 4:
case 6:
case 8:
cout << "Even";
break;
case 1:
case 3:
case 5:
case 7:
cout << "Odd";
break;
}
```

Answers:

a) invalid: you cannot use ‘,’ right after “case”
b) invalud: you canno use ‘,’ right after “case”
c) valid: but only if the result is 5 and 0 would get the switch do something
d) valid: but only if the result is 8 and 7 would get the switch do something

- Suppose that alpha is an int variable. Consider the following C++ code.

```
cin >> alpha;
switch (alpha % 6){
        case 0:
                alpha --;
                break;
        case 1: case 2:
                alpha = alpha * 2;
                break;
        case 3:
                break;
        case 4:
                alpha = alpha - 5;
        case 5:
                alpha ++;
                break;
        default:
                alpha = alpha / 3;
}
```

a) What is the output if the input is 8
b) What is the output if the input is 13
c) What is the output if the input is 17
d) What is the output if the input is 24

Answer:

a) alpha = 16
b) alpha = 26
c) alpha = 18
d) alpha = 23

- In the following code, correct any errors that would prevent the program from compiling or running

```
Include <iostream>
main()
{
        int num1, num2;
        bool found;
        cout << “Enter two integers: ;
                cin >> num1 >> num2;
        cout << endl;
        if (num1 >= num2) && num2 > 0
                switch (num % num2)
        {
                case 1
                        found = (num / num2) >= 6;
                        break;
                case 2: case 3:
                        num1 = num2 / 2;
                        break;
                default:
                        num2 = num1 * num2;
}
else
{
        found = (2 * num2 < num1);
        if found
                cin >> num2
                num 1 = num2 – num1;
        temp = (num1 + num2) / 10;
        if num2
        {
                num1 = num2;
                num2 = temp;
        }
        cout << num1 << “ ” << num2 << endl;
}
```

Answer:

```
#include <iostream>
using namespace std;
int main() {

int num1, num2, temp;
bool found;

cout << "Enter two integers: ";
cin >> num1 >> num2;

cout << endl;

        if (num1 >= num2 && num2 > 0) {
                switch (num1 & num2) {
                case 1:  {
                        found = (num1 / num2) >= 6;
                        } break;

                case 2:
                case 3:  {
                        num1 = num2 / 2;
                } break;

                default:
                        num2 = num1 * num2;
                        }
                }

                else {
                        found = (2 * num2 < num1);

                }

                if (found){
                        cin >> num2;
                        num1 = num2 - num1;
                }

                temp = (num1 + num2) / 10;
                if (num2){
                        num1 = num2;
                        num2 = temp;
                }
                cout << num1 << ' ' << num2 << endl;
}
```

- After correcting the code, answer the following questions. (If needed, insert the prompt lines to inform the user for the input)

  a) What is the output if the input is **10 8 6**?
  b) What is the output if the input is **4 9 11**?

  Answers:

  a) **6 0**
  b) **9 1**

- Suppose the input is **3**. What is the value of **beta** after the following C++ code executes

```
cin >> beta;
switch (beta){
        case 3:
                beta = beta + 3;
        case 1:
                beta++;
                break;
        case 5:
                beta = beta + 5;
        case 4:
                beta = beta + 4;
}
```

  Answer:

  7

- Suppose the input is **6.** What is the value of **a** after the following C++ code executes

```
cin >> a;
if (a > 0)
        switch (a) {
                case 1:
                        a = a + 3;
                case 3:
                        a++;
                        break;
                case 6:
                        a = a + 6;
                case 8:
                        a = a * 8;
                        break;
                default:
                        a--;
                }
else
        a = a + 2;
```

Answer:

96

- Suppose that **str1, str2** and **str3** are **string** variables, and **str1 = "English", str2 = "Computer Science"**, and **str3 = "Programming"**. Evaluate the following expressions

  a) str1 >= str2
  b) str1 != "english"
  c) str3 < str2
  d) str2 >= "Chemistry"

Answers:

a) **true**
b) **true**
c) **false**
d) **true**

- What is the output of the following statements?

  a) if ('+' < '*') cout << "+*"; cout << "%%" << endl;
  b) if (10 <= 2 * 5) cout << "10"; cout << "2 * 5"; cout << endl;
  c) if ('a' < 'A') cout << 'a'; cout << 'A'; cout << endl;
  d) if ("C++" >= "C—") cout << "C++ << endl; cout << "C—" << endl;
  e) if ("Sam" <= "Tom") cout << "Sam Tom" << endl; cout << "Tom Sam" << endl;

f) if (6 == 2 * 4 – 2) cout << 3 * 4 / 6 – 8 << endl; cout << “**” << endl;”

Answers:

a) **%%**
b) 102 * 5
c) A
d) C--
e) Tom Sam
f) -6
**

- What is the output of the following statements?

a) if (‘R’ < ‘$’ && ‘&’ <= ‘#’) cout << “$#”; cout << “R&”; cout << endl;
b) if (‘4’ > ‘3’ || 2 < -10) cout << “1 2 3 4” << endl; cout << “$$” << endl;
c) if (“Jack” <= “John” && “Business” >= “Accounting”)
cout << “Jack Accounting” << endl;
cout << “John Business” << endl;

Answers:

a) **R&**
b) **1 2 3 4**
$$
c) **Jack Accounting**
John Business

- What is the output of the following program?

```
#include <iostream>

using namespace std;

int main() {
        int x;
        int a = 265;
        cout << (x = 25) << endl;          // 25
        cout << (x == 98) << endl;         // false
        cout << (x > 10) << endl;          // true
        cout << (3 * x < a) << endl;       // true
        cout << (10 * x == a - 15) << endl; // true

        return 0;
}
```

Answer:

25
0
1
1
1

- What is the output of the following C++ code?

```
#include <iostream>
using namespace std;

int main(){

int x = 10;
int y = 20;
if (x < 20 && y > 20){
x = 2 * x;
y = y / 2;

cout << x << " " << y << " " << x - y << endl;
}
else {
x = y / x;
cout << x << " " << y << " " << x * x + y * y << endl; // 2 20 404,  xD
}
}
```

Answer:

2 20 404

- Suppose that beta is an int variable. Consider the following C++ code

```cpp
#include <iostream>
#include <cmath>

using namespace std;

int main(){

int beta;
cin >> beta;

switch (beta % 7){
        case 0:
        case 1:
                beta = beta * beta;
                break;
        case 2:
                beta++;
                break;
        case 3:
                beta = static_cast<int>(sqrt(beta * 1.0));
                break;
        case 4:
                beta = beta + 4;
        case 6:
                beta = beta--;
                break;
        default:
                beta = -10;
}
}
```

a) What is the output if the input is 11?
b) What is the output if the input is 12?
c) What is the output if the input is 0?
d) What is the ouptut if the input is 16?

Answers:

a) **15**
b) **-10**
c) **0**
d) 17

- Suppose that num is an int variable. Consider the followig C++ code

```
#include <iostream>
#include <cmath>

using namespace std;

int main(){

        int num;
        cin >> num;

        if (num >= 0)
                switch (num){
                        case 0:
                                num = static_cast<int>(pow(num, 3.0));
                                break;
                        case 2:
                                num = ++num;
                                break;
                        case 4:
                                num = num - 4;
                                break;
                        case 5:
                                num = num * 4;
                        case 6:
                                num = num / 6;
                                break;
                        case 10:
                                num--;
                                break;
                        default:
                                num = -20;
                        }
        else
                num = num + 10;
}
```

a) What is the output if the input is 5?
b) What is the output if the input is 26?
c) What is the output if the input is 2?
d) What is the output if the input is -5?

Answers:

a) **3**
b) **-20**
c) **3**
d) **5**

- The following program contains errors. Correct them so that the program will run and output 2 = 21.

```
#include <iostream>
using namespace std;

const int SECRET = 5

main(){
        int x, y, w, z;
        z = 9;

        if z > 10
                x = 12; y = 5; w = x + y + SECRET;
        else
                x = 12; y = 4, w = x + y + SECRET;

        cout << "w = " << w << endl;
}
```

Answer:

```cpp
#include <iostream>
using namespace std;

const int SECRET = 5;

int main(){
	int x, y, w, z;
	z = 9;

	if (z > 10){
		x = 12;
		y = 5;
		w = x + y + SECRET;
	}
	else {
		x = 12;
		y = 4;
		w = x + y + SECRET;
	}

	cout << "w = " << w << endl;
}
```

- In the following code, correct any errors that would prevent the program from compiling or running

```
include <iostream>

main()
{

        int a, b;
        bool found;
        cout << "Enter two integers: ;
        cin >> a >> b;

        if a > a *b && 10 < b
                found = 2 * a > b;
        else
        {
                found = 2 * a < b;
                if found
                        a = 3;
                        c = 15;
                if b
                {
                        b = 0;
                        a = 1;
                }
        }
}
```

Answer:

```cpp
#include <iostream>
using namespace std;

int main() {

	int a, b, c;
	bool found;
	cout << "Enter two integers: ";
	cin >> a >> b;

	if (a > a * b && 10 < b)
		found = 2 * a > b;
	else {
		found = 2 * a < b;
		if (found) {
			a = 3;
			c = 15;
		}

		if (b) {
			b = 0;
			a = 1;
		}
	}
}
```

Q3

- Write a C++ program to ask student to enter his grade then print the result ”pass” or “failed”

```cpp
#include <iostream>

using namespace std;

int main(){

        double grade;

        cout << "Enter the grade: ";
        cin >> grade;

        if (!(grade >= 1 && grade <= 100)){
                cout << "grade must be between 1-100" << endl;
                return 1;
        }

        grade >= 50 ? cout << "pass" << endl : cout << "failed" << endl;
}
```

- Write a C++ program to print the number if the number is devisable by 5

```cpp
#include <iostream>

using namespace std;

int main(){

        int num;

        cout << "Enter a number to check if it's devisable by 5: ";
        cin >> num;

        num % 5 == 0 ? cout << "True" << endl : cout << "False" << endl;

        return 0;
}
```

- (Guess game) write a C++ program to initial value in variable then ask the user to guess the number, if the number which the user guessed is equal to you number, print “you win” else print “you lost”

```cpp
#include <cstdlib>
#include <ctime>
#include <iostream>

using namespace std;

 // An over-kill  ?  yes

int main() {
	srand(time(NULL));  // seeds the random based on the time

	int range = (rand() % 10) + 1;  // so it would change the range every time, it's more fun
	int tries = (rand() % 6) + 1;  // the number of tries that you get, also to make it fun

	int current_try = 0;

	int random_num = (rand() % range) + 1;

	int guessed_num;


	cout << "_____" << endl;
	cout << "_____Guessing Game_____" << endl;
	cout << "_____" << endl;

	cout << "The range: 1-" << range << endl;
	cout << "Your total tries: " << tries << endl;

	cout << endl;

guess:

	cout << "Enter your guess: ";
	cin >> guessed_num;

	if (guessed_num == random_num) {
		cout << "You Win!" << endl;
		return 0;
	} else {
		current_try++;

		if (tries > current_try) {
			cout << "You lost, try again" << endl;
			goto guess;
		}

		else {
			cout << "You lost!. You can't play anymore :(" << endl;
			return 1;
		}
	}
}
```

- Write a C++ program that calculates the rate of student if the grade >= 90 print “Excellent”...etc

```cpp
#include <iostream>

using namespace std;

int main(){
	double grade;
	cout << "Enter your Average grade: ";
	cin >> grade;
	if (!(grade >= 1 && grade <= 100)){
		cout << "Grade must be between 1-100" << endl;
		return 1;
	}
	cout << "\nWith for loop: " << endl;

	if (grade >= 90)
		cout << "Excellent" << endl;
	else if (grade >= 75)
		cout << "Very good" << endl;
	else if (grade >= 65)
		cout << "Good" << endl;
	else if (grade >= 50)
		cout << "Acceptable" << endl;
	else
		cout << "Failed" << endl;

	cout << "\nWith switch: " << endl;
	// I know..I know
	switch (grade >= 90){
	  case true:
		cout << "Excellent" << endl;
		break;
	  case false:
		switch (grade >= 75){
		  case true:
			cout << "Very good" << endl;
			break;
		  case false:
			switch (grade >= 65){
			  case true:
				cout << "Good" << endl;
				break;
			  case false:
				switch (grade >= 50){
				  case true:
					cout << "Acceptable" << endl;
					break;
				  case false:
					cout << "Failed" << endl;
					break;
				}
			}
		}
	}
}
```

- Write a C++ program that checks the road signals and print the colors for it, prints **stop** if it's red and **prepare** if yellow and **go** if green

```cpp
#include <chrono>
#include <thread>
#include <iostream>
#include <string>

using namespace std;

int main() {

	cout << "\033[31m" << "STOP!" << endl;

	this_thread::sleep_for(chrono::seconds(4));

	cout << "\033[33m" << "Prepare" << endl;

	this_thread::sleep_for(chrono::seconds(2));

	cout << "\033[32m" << "GO!" << endl;

	this_thread::sleep_for(chrono::seconds(1));

	return 0;
}
```

- Wrote a C++ program to solve the second degree equation

- Write a C++ program that scans the state of the atmosphere if it's hot or cold or cool

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	double temp;

	cout << "Enter the temperature: ";
	cin >> temp;


	if (temp >= 73)
		cout << "Hot!" << endl;

	else if (temp >= 12 && temp <= 73)
		cout << "Cold!" << endl;

	else
		cout << "Cool!" << endl;
}
```

- Write a C++ program that checks if the user enters the dimensions of a sqaure or a rectangle

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	double height, width;

	cout << "Enter the height: ";
	cin >> height;

	cout << "Enter the width: ";
	cin >> width;
	if (height == width)
		cout << "That's a square" << endl;
	else
		cout << "That's a rectangular" << endl;
return 0;
}
```

- Write a C++ program which calculates the age group (chlid, yound, old)

Answer:

```
#include <iostream>
#include <string>

using namespace std;

int main(){

	int age;
	string age_group;

	cout << "Enter your age: ";
	cin >> age;

	if (age <= 0){
		cout << "You cannot be 0 or below :(" << endl;
		return 1;
	}

	if (age >= 1 && age <= 18)
		age_group = "a child";

	else if (age >= 19 && age <= 25)
		age_group = "young";

	else
		age_group = "old";

	cout << "You are " << age_group << endl;
}
```

- Write a C++ program like a calculator for the basic operationsm the user enter two numbers and operation, the program calculate the result. Rewrite the same program with switch

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	double x, y;
	char op;

	cout << "Enter first number: ";
	cin >> x;

	cout << "Enter second number: ";
	cin >> y;

	cout << "Enter the operation: ";
	cin >> op;

	cout << endl;

	if (op == '+')
		cout << x << op << y << " = " << x + y << endl;
	else if (op == '-')
		cout << x << op << y << " = " << x - y << endl;
	else if (op == '*')
		cout << x << op << y << " = " << x * y << endl;
	else
		cout << "Unknown operation sign" << endl;

	switch (op){
		case '+':
			cout << x << op << y << " = " << x + y << endl;
			break;
		case '-':
			cout << x << op << y << " = " << x - y << endl;
			break;
		case '*':
			cout << x << op << y << " = " << x * y << endl;
			break;
		default:
			cout << "Unknown operation" << endl;
	}

	return 0;
}
```

- Write a C++ program that calculate the volume of blood if it is a natural between 4 – 6

  a) if less the he's suffering from a decrease in blood
  b) if more then he has more blood than what he need

  Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	int blood_vol;

	cout << "Enter your blood volume: ";
	cin >> blood_vol;

	if (4 <= blood_vol && 6 >= blood_vol)
		cout << "That's good" << endl;
	else
		cout << "You should go to the hospital" << endl;

	return 0;
}
```

- (Odd or Even) Write a C++program that reads an integer and determines and prints whether it is odd or even

  Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

int x;

cout << "Enter a number: ";
cin >> x;

if (x % 2 == 0)
cout << "Even" << endl;
else
cout << "Odd" << endl;

return 0;
}
```

- (Largest and smallest inegers) Write a C++ program that reads 3 integers and then determines and peints the largest and the smallest integer in the group

Answer:

```cpp
#include <iostream>

using namespace std;

int getLargest(const int a, const int b) {
	if (a > b)
		return a;
	else
		return b;
}

int getSmallest(const int a, const int b) {
	if (a < b)
		return a;
	else
		return b;
}

int main() {

	int a, b, c;

	int largest, smallest;

	cout << "Enter three numbers separated by a space (e.g 1 2 3): ";
	cin >> a >> b >> c;

	largest = getLargest(getLargest(a, b), c);

	smallest = getSmallest(getSmallest(a, b), c);

	cout << "Largest number: " << largest << endl;
	cout << "Smallest number: " << smallest << endl;

	return 0;
}
```

- (Multiples) Write a program that reads two integers and determines and prints if the first is a multiple of the second

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	int x, y;

	cout << "Enter two numbers separated by a space (e.g: 1 2): ";
	cin >> x >> y;

	if (y == 0){
		cout << "The second number cannot be 0" << endl;
		return 1;
	}

	if ( x % y == 0)
		cout << x << " is the multiple of " << y << endl;

	else
		cout << x << " is not the multiple of " << y << endl;

	return 0;
}
```

- Write a C++ program which chekck the entered value (char, number, sign) and print what kind of it

Answer:

```cpp
#include <iostream>
#include <string>

using namespace std;

bool isNumber(const string str){
	for (char ch : str){
		if (!isdigit(ch))
		return false;
	}

	return true;
}

bool isChar(const string str){
	if (str.length() == 1 && isalpha(str[0]))
		return true;
	else
		return false;
	}

int main(){

	string input;

start:

	cout << "Enter a value (char, number, sign): ";
	cin >> input;

	if (input[0] == '-' || input[0] == '+')
		cout << "That's a sign" << endl;

	else if (isNumber(input))
		cout << "That's numbers" << endl;

	else if (isChar(input))
		cout << "That a char" << endl;

	else{
		cout << "That's not valid, try again" << endl;
		goto start;
	}
}
```

- Write a single statement that indicates each of the following
  a) Display the message “Enter two numbers”
  b) Assign the sum of variables x, y and z to the p variable
  c) The following condition is to be tested in an if..else selection statement: The current value of variable **m** is greater than twice the current value of **v**
  d) Obtain values for variables **s, r,** and **t** from the keyboard

  Answer:

```
#include <iostream>

using namespace std;

int main(){

        // 1
        cout << "Enter two numbers" << endl;

        // 2
        int x = 1, y = 1, z = 1, p;

        p = x + y + z;

        // 3
        int m = 2, v = 2;

        if ((m + m) > v) cout << "Yes" << endl;

        // 4
        int s, r, t;

        cin >> s >> r >> t;
}
```

- Write a C++ program that obtain two numbers from the keyboard, and determine and display (if either) is the larger of the two numbers

Answer:

```
#include <iostream>

using namespace std;

int main() {

	int x, y;

	cout << "Enter two numbers separated by a space (e.g: 1 2): ";
	cin >> x >> y;

	if (x == y)
		cout << x << " and " << y << " are the same values" << endl;

	else if (x > y)
		cout << x << " is bigger than " << y << endl;
	else
		cout << y << " is bigger than " << x << endl;
}
```

- (Salary Calculator) Develop a program that will determine the gross pay for each of serverl empolyees. The company pays “stright time” for the first 40 hours worked by each empolyee and pays “time-and-a-half” for all hours worked excess of 40 hours. You’re given a list of employees of the company, the number of hours each employee worked last week and the hourly rate of each employee. Your program should input this information for each employee, and should determine and display the empolyee’s gross pay. Here is a sample input/output dialog

  Enter # of hours worked (-1 to end): 39

  Enter hourly rate of the worker ($ 00.00): 10.00

  Salary is $ 390.00

  Answer:

```cpp
#include <iostream>
#include <string>
#include <vector>

using namespace std;

struct Employee {
	string name;
	double hoursWorked;
	double hourlyRate;
	double grossPay;
};

double calcGrossPay(const double hrs_w, const double hrs_r) {

	double pay = hrs_w * hrs_r;

	if (hrs_w > 40)
		return pay * 1.5;

	return pay;
}

int main() {
	vector<Employee> employees;

	int number_of_employees;

	string name;
	double hours_worked, hourly_rate;

	cout << "How many employees are there (e.g: 5): ";
	cin >> number_of_employees;
	cin.ignore();

	cout << endl;
```

```
        for (int i = 1; i <= number_of_employees; i++) {

                cout << "Enter employee name: ";
                getline(cin, name);

                cout << "Enter the amount of hours worked (e.g: 20): ";
                cin >> hours_worked;

                cout << "Enter the amount of hourly rate (e.g: 13.93): ";
                cin >> hourly_rate;

                cout << endl;

                cin.ignore();

                employees.push_back(Employee{
                                name : name,
                                hoursWorked : hours_worked,
                                hourlyRate : hourly_rate,
                                grossPay : calcGrossPay(hours_worked, hourly_rate)
                });
        }

        cout << endl;

        for (const Employee employee : employees) {
                cout << "Employee: " << employee.name << endl;
                cout << "Hours Worked: " << employee.hoursWorked << endl;
                cout << "Hourly Rate: $" << employee.hourlyRate << endl;
                cout << "Gross Pay: $" << employee.grossPay << endl;

                cout << endl;
        }
}
```

- (Palindrime Tester) A palindrome is a number or a text phrase that reads the same backward as forward. For example, each of the following five-digit integers is a palindrome: 12321, 55555, 45554 and 11611. Write a program that reads in a five-digit integer and determines whether or not it;s a palindrome.

  Answer:

```cpp
#include <iostream>
#include <string>
#include <algorithm>

using namespace std;

int main() {

	string text;
	string text_rev;

	cout << "Enter the value: ";
	cin >> text;

	text_rev = text;

	reverse(text_rev.begin(), text_rev.end());

	if (text_rev == text)
		cout << "Valid Palindrome" << endl;
	else
		cout << "Invalid Palindrome" << endl;
}
```

- Write a C++ program to check uppercase or lowercase alphabets, once with **if** and other with **switch**

Answer:

```
#include <iostream>
#include <iomanip>

using namespace std;

int main(){
	char ch;

	cout << "Enter a character: ";
	cin >> ch;

	if (isupper(ch))
		cout << "Character is uppercase" << endl;
	else if (islower(ch))
		cout << "Character is lowercase" << endl;
	else
		cout << "Not a character" << endl;

	switch ((bool)isupper(ch)){
		case true:
			cout << "Character is uppercase" << endl;
			break;
		case false:
			switch ((bool)islower(ch)){
				case true:
					cout << "Character is lowercase" << endl;
					break;
				case false:
					cout << "Not a character" << endl;
					break;
			} break;
		default:
			cout << "?" << endl;
	}
}
```

- Write a C++ program to check entered characters vowel and consonants

Answer:

```
#include <iostream>

#define VOWELS "AEIOUaeiou"

using namespace std;

bool isVowel(const char ch) { return string(VOWELS).find(ch) != string::npos; }

int getVowels(const string str) {
	int vowel_counter = 0;

	for (char ch : str) {
		if (isVowel(ch))
			vowel_counter++;
	}

	return vowel_counter;
}


int main() {

	string text;
	int vowels = 0;

	cout << "Enter text to check: ";
	getline(cin, text);

	vowels = getVowels(text);

	cout << "Number of Vowels: " << vowels
		<< "\nNumber of Consonant: " << (text.length() - vowels) << endl;
}
```

- Write a C++ program that takes two integers and check if they are equal or not

Answer:

```
#include <iostream>

using namespace std;

int main() {

int a, b;

        cout << "Enter two numbers separated by a space (e.g: 1 2): ";
        cin >> a >> b;

        if (a == b)
                cout << "They are equal" << endl;
        else
                cout << "They aren't equal" << endl;

        switch ( a == b){
                case true:
                        cout << "They are equal" << endl;
                        break;
                case false:
                        cout << "They aren't equal" << endl;
                        break;
}
}
```

- Write a C++ program to determine a candidate's age is eligible for casting the vote or not

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	Int age;

	cout << "Enter your age (e.g: 21): ";
	cin >> age;

	if (age >= 18)
		cout << "Thank you for voting" << endl;
	else
		cout << "You cannot vote, you are not eligible to vote" << endl;

	switch (age >= 18){
		case true:
			cout << "Thank you for voting" << endl;
			break;
		case false:
			cout << "You cannot vote, you are not eligible to vote" << endl;
			break;
	}
}
```

- Write a C++ program to find the eligibility of admission for Colloge of Engineering based on the avgerage

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	double average;

	cout << "Thanks for choosing College of Engineering" << endl;
	cout << "Enter you high school average (e.g: 91.38): ";
	cin >> average;
	cout << endl;

	if (average >= 80)
		cout << "Welcome" << endl;
	else
		cout << "You are not acceptable, your average is low" << endl;

	switch (average >= 80){
		case true:
			cout << "Welcome" << endl;
			break;
		case false:
			cout << "You are not acceptable, your average is low" << endl;
			break;
	}
}
```

- Write a C++ program to enter month number and print the number of days in that month

Answer:

```cpp
#include <iostream>
#include <vector>

using namespace std;

int getDays(const int month){
	int days;

	if (month == 2){
		days = 28;
		return days;
	}

	if (month == 4 || month == 6 || month == 9 || month == 11)
		days = 30;
	else
		days = 31;

	return days;
}

int main(){

	int month_number;

	cout << "Enter the month number (e.g: 3): ";
	cin >> month_number;

	cout << endl;

	if (month_number > 12 || month_number < 1){
		cout << "Can only be between 1-12" << endl;
		return 1;
	}

	cout << "The total days of the month: " << getDays(month_number) << endl;
}
```

- Write a C++ program to check whether a triangle can be formed from the given values

Answer:

```cpp
#include <iostream>

using namespace std;

bool canFormTriangle(const int a, const int b, const int c) {
	/*
	rules are
	a + b > c
	a + c > b
	b + c > a
	*/
	return (a + b > c) && (a + c > b) && (b + c > a);
}

int main(){

	int a, b, c;

	cout << "Enter the angles of a triangle separated by spaces (e.g: 4 4 3): ";
	cin >> a >> b >> c;

	if (canFormTriangle(a, b, c))
		cout << "Angles are valid to form a triangle" << endl;
	else
		cout << "Angles cannot form a triangle" << endl;
}
```

- Write a C++ program to check wheither a square can be form from given values

Answer:

```cpp
#include <iostream>

using namespace std;

bool canFormSquare(const int a, const int b, const int c, const int d) {
	return (a == b) && (b == c) && (c == d);
}

int main(){

	int a, b, c, d;

	cout << "Enter the angles for the square separated by spaces (e.g: 4 4 4 4): ";
	cin >> a >> b >> c >> d;

	if (canFormSquare(a, b, c , d))
		cout << "Angle is valid to form a square" << endl;
	else
		cout << "Angle cannot form a square" << endl;
}
```

- Write a C++ program to check whether a rectangle can be formed from given values

Answer:

```cpp
#include <iostream>

using namespace std;

bool canFormRectangle(const int side1, const int side2, const int side3, const int side4) {
	return (side1 == side3) && (side2 == side4);
}

int main(){

	int a, b, c ,d;

	cout << "Enter the angles for a rectangular separated by spaces (e.g: 4 2 4 2): ";
	cin >> a >> b >> c >> d;

	if (canFormRectangle(a, b, c, d))
		cout << "Angles are valid to form a rectangle" << endl;
	else
		cout << "Cannot form a rectangular from given angles" << endl;
}
```

- Write a C++ program to create a calculator using switch statements

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	double x, y;
	char op;

	cout << "Enter the equation (e.g: 1 + 2): ";
	cin >> x >> op >> y;

	switch (op){
		case '-':
			cout << x << op << y << " = " << x - y << endl;
			break;
		case '+':
			cout << x << op << y << " = " << x + y << endl;
			break;
		case '/':
			cout << x << op << y << " = " << x / y << endl;
			break;
		case '*':
			cout << x << op << y << " = " << x * y << endl;
			break;
		default:
			cout << "Invalid operation sign, valid operation: - + / *" << endl;
	}
}
```

- Write a C++ program to check even or odd using switch case

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	int x;

	cout << "Enter a number (e.g: 2): ";
	cin >> x;

	switch (x % 2 == 0){
		case true:
			cout << "Even" << endl;
			break;
		case false:
			cout << "Odd" << endl;
			break;
	}
}
```

- Write a C++ program to print the gender (Male/Femal) based on the given (M/F) value using switch cases

Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	char gender;

	cout << "Enter the gender character (e.g: M): ";
	cin >> gender;

	gender = toupper(gender);

	switch (gender){
		case 'F':
			cout << "Female" << endl;
			break;
		case 'M':
			cout << "Male" << endl;
			break;
		default:
			cout << "Invalid gender" << endl;
	}
}
```

- Write a C++ program to find the greater of two number using switch cases

  Answer:

```cpp
#include <iostream>

using namespace std;

int main(){

	double a, b;

	cout << "Enter two number separated by a space (e.g: 1 2): ";
	cin >> a >> b;

	switch(a > b){
		case true:
			cout << a << " is bigger than " << b << endl;
			break;
		case false:
			cout << b << " is bigger than " << a << endl;
			break;
	}
}
```

- Write a C++ to replace the value of two variables if they are not equal

Answer:

```cpp
#include <iostream>

using namespace std;

void swapVarsVal(int& a, int& b) {
	a = a + b; // get both to a
	b = a - b; // get both - b = previous a
	a = a - b; // get both - b (which is a) = b
}

int main() {

	int a, b;

	cout << "Enter two values separated by a space (e.g: 1 2): ";
	cin >> a >> b;

	cout << "before" << endl;
	cout << "a = " << a << ", b = " << b << endl;

	if (!(a == b)) {
		swapVarsVal(a, b);
		cout << "after" << endl;
		cout << "a = " << a << ", b = " << b << endl;
	}

	swapVarsVal(a, b);

	cout << endl << "using switch" << endl;

	switch (a != b){
		case true:
			swapVarsVal(a, b);
			cout << "a = " << a << ", b = " << b << endl;
			break;
		case false:
			cout << "a = " << a << ", b = " << b << endl;
			break;
	}
}
```

- Write a C++ program to print “Saturday” if the user entered 1, “Sunday” if the user entered 2..etc

Answer:

```
#include <iostream>

using namespace std;

int main(){

        int day_of_week;

        cout << "Enter the day of the week (e.g: 2): ";
        cin >> day_of_week;

        if (day_of_week == 1)
                cout << "Saturday" << endl;
        else if (day_of_week == 2)
                cout << "Sunday" << endl;
        else if (day_of_week == 3)
                cout << "Monday" << endl;
        else if (day_of_week == 4)
                cout << "Tuesday" << endl;
        else if (day_of_week == 5)
                cout << "Wednesday" << endl;
        else if (day_of_week == 6)
                cout << "Thursday" << endl;
        else if (day_of_week == 7)
                cout << "Friday" << endl;
        else
                cout << "Invalid day of week" << endl;
```

```
        switch (day_of_week){
                case 1:
                        cout << "Saturday" << endl;
                        break;
                case 2:
                        cout << "Sunday" << endl;
                        break;
                case 3:
                        cout << "Monday" << endl;
                        break;
                case 4:
                        cout << "Tuesday" << endl;
                        break;
                case 5:
                        cout << "Wednesday" << endl;
                        break;
                case 6:
                        cout << "Thursday" << endl;
                        break;
                case 7:
                        cout << "Friday" << endl;
                        break;
                default:
                        cout << "Invalid day of week" << endl;
        }
}
```