Last Lecture

- Any Questions

- Interesting question was asked: “Why accessing array values via pointer arithmetic is important when we can access array values via subscripting?”

Int A[10];

➢ A[5]

- Fetch base address of ‘A’
- Multiply 5 by data type of ‘A’, i.e., 5*4
- Add result in base address of A, i.e., base address + 20

Multiplication

Addition

➢ *(A+5)

- Fetch pointer ‘A’
- Add 5 in pointer A,

Addition

Typecasting (Type conversion)

- The process of converting one predefined type into another is called as type conversion

- C++ facilitates the type conversion into the following two forms :

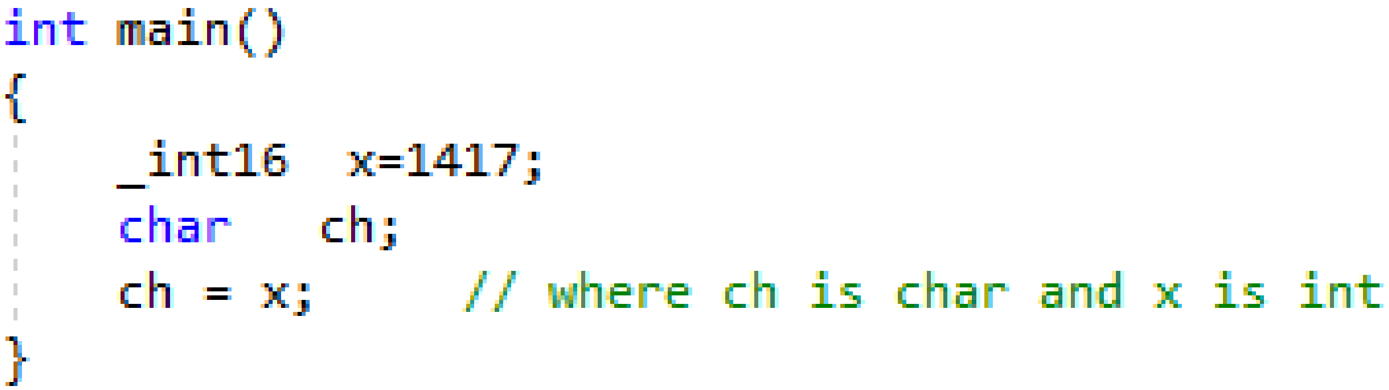
  - ❑ Implicit Type Conversion
  - ❑ Explicit Type Conversion

Implicit Type Conversion

- Conversion performed by the compiler without programmer's intervention whenever differing data types are intermixed in an expression

- The value of the right side (expression side) of the assignment is converted to the type of the left side (target variable)

- Example:



```
int main()
{
    _int16  x=1417;
    char    ch;
    ch = x;      // where ch is char and x is int
}
```

Implicit Type Conversion

- if **x** was having value 1417 (whose binary equivalent is 0000010110001001)

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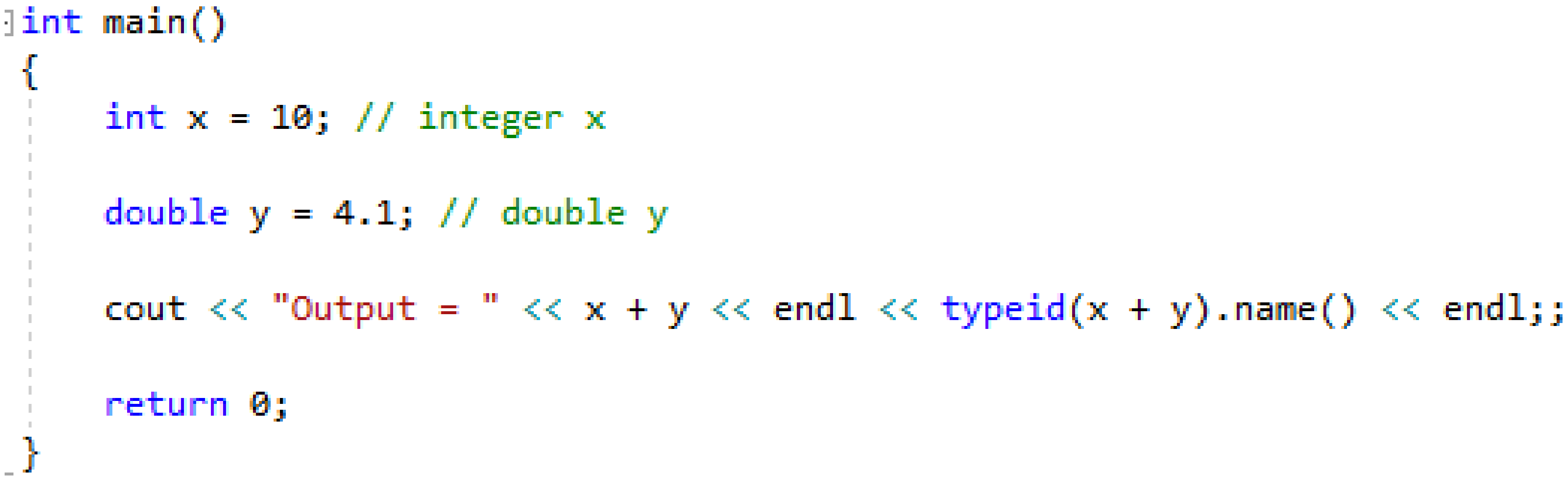
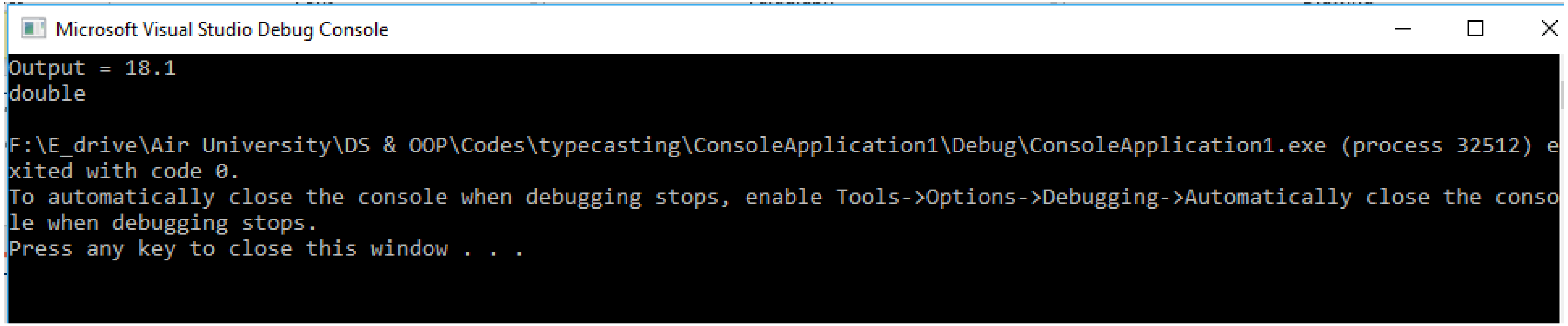
- **ch** will have lower 8-bits i.e., 10001001 resulting in loss of information.

Implicit Type Conversion

- Another example



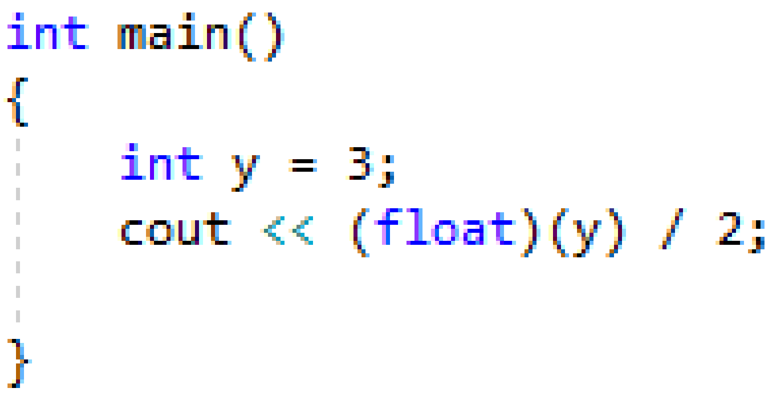
```
int main()
{
    int x = 10; // integer x

    double y = 4.1; // double y

    cout << "Output = " << x + y << endl << typeid(x + y).name() << endl;;

    return 0;
}
```



```
Output = 18.1
double

F:\E_drive\Air University\DS & OOP\Codes\typecasting\ConsoleApplication1\Debug\ConsoleApplication1.exe (process 32512) e
xited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

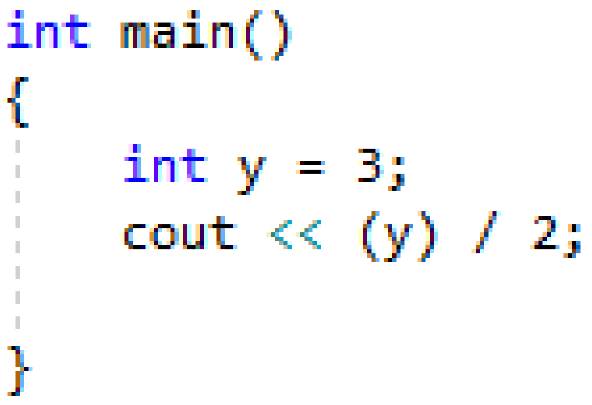
Explicit Type Conversion

- User-defined conversion that forces an expression to be of specific type



```
int main()
{
    int y = 3;
    cout << (float)(y) / 2;

}
```

Output= 1.5



```
int main()
{
    int y = 3;
    cout << (y) / 2;

}
```

Output= 1

Memory Allocation

- Dynamic memory allocation is necessary because, during compile time, we may not know the exact memory needs to run the program.

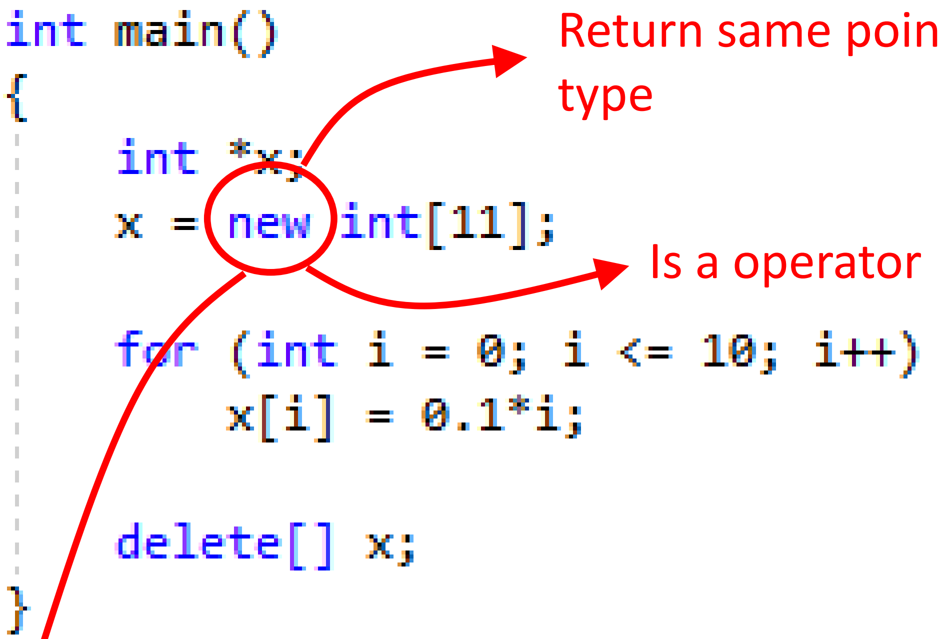
new **malloc()**

- C++ also does not have automatic garbage collection. Therefore a programmer must manage all dynamic memory used during the program execution

delete[] **free()**

Memory Allocation

new / delete[]



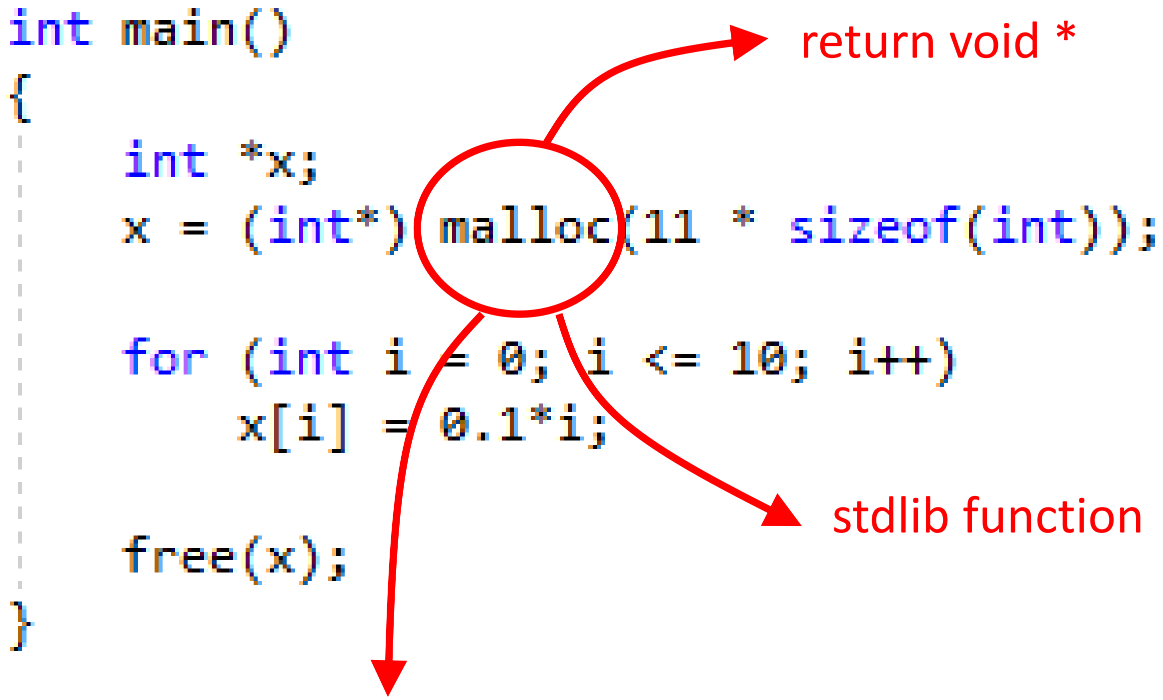
```
int main()
{
    int *x;
    x = new int[11];

    for (int i = 0; i <= 10; i++)
        x[i] = 0.1*i;

    delete[] x;
}
```

Return same pointer type

Is a operator

Allocate memory and calls constructor for initialization

malloc() / free() / realloc()



```
int main()
{
    int *x;
    x = (int*) malloc(11 * sizeof(int));

    for (int i = 0; i <= 10; i++)
        x[i] = 0.1*i;

    free(x);
}
```

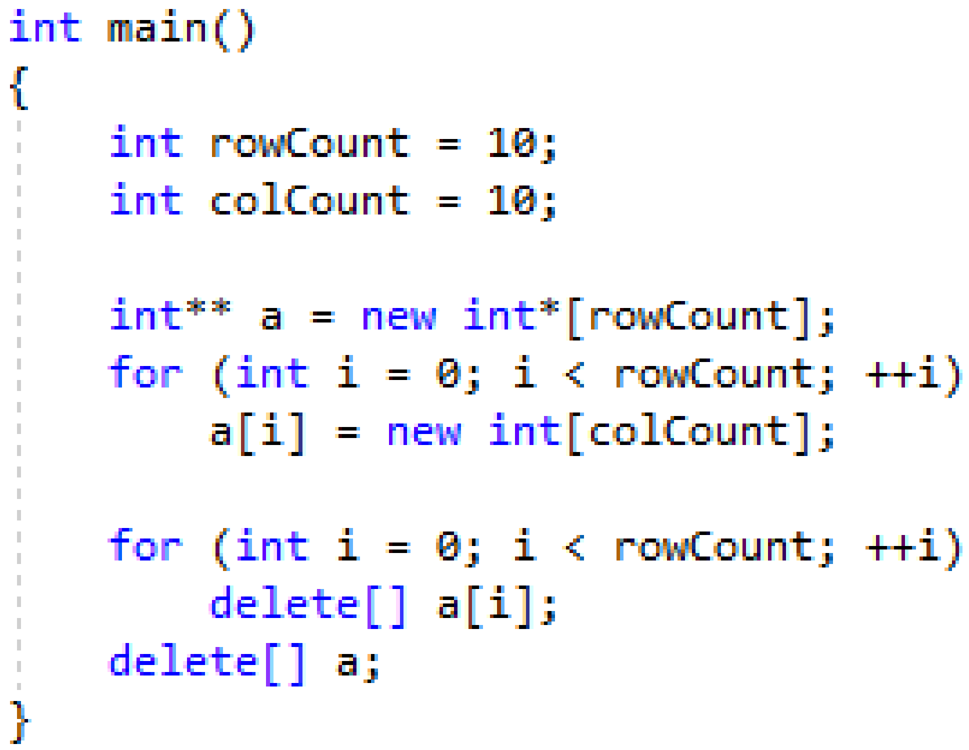
return void *

stdlib function

Allocate memory and Does not calls constructor

Memory Allocation (2D array)

new / delete[]

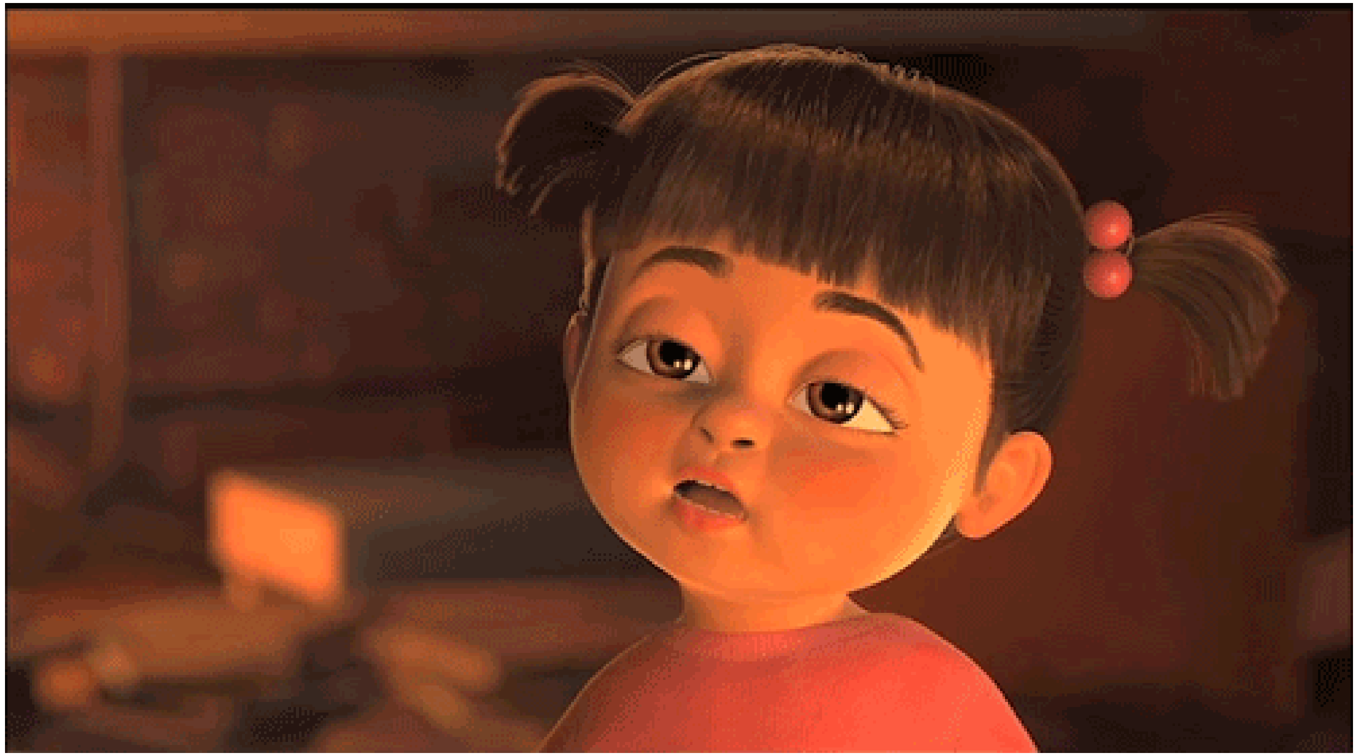


```
int main()
{
    int rowCount = 10;
    int colCount = 10;

    int** a = new int*[rowCount];
    for (int i = 0; i < rowCount; ++i)
        a[i] = new int[colCount];

    for (int i = 0; i < rowCount; ++i)
        delete[] a[i];
    delete[] a;
}
```

malloc() / free()

YOUR TURN

Thanks a lot



If you are taking a Nap, **wake up**.......Lecture Over