MA122 - Computer Programming and Appllications

Indian Institute of Space Science and Technology

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Data Types

1. integer

```
1  unsigned long x;
2  long y;
3  unsigned int z;
4  int a;
5  unsigned short b;
6  short c;
7  char d;
8  bool e;
```

2. floating-point

```
1  float x;
2  double y;
3  long double z;
```

Operators

1. Arithmetc Operators

```
1
2 int y=a+b
3 int y=a-b
4 double a/d
5 int a%d
```

2. Operator Precedence
3. Operator Associativity

Compound Types

1. arrays
2. strings
3. structures
4. pointers
5. dynamic memory with new and delete
6. creating dynamic arrays:
   ```
   int *psome = new int [10];
   ```
7. creating dynamic structures, arrow membership operator ->
8. Pointers, arrays, and pointer arithmetic

Loops and relational expressions

1. `for` loop
2. increment and decrement operators: `++` and `--`
3. Prefixing and Postfixing
4. relational operators: `>`, `>=`, `==`, `<=`, `<`, and `!=`
5. Combination Assignment operators, example: `+=`
6. `comma` operator
7. `while` loop
8. `do while` loop
9. compound statements, or blocks
10. nested loops and two-dimensional array

Branching statements and logical operators

1. `if` statement
2. `if else` statement
3. Logical operators: `&&`, `||`, and `!`
4. conditional operator: `?  :`
   example: `5 > 3 ?  10 :  12`
5. `switch` statement
6. `continue` and `break` statements
7. Basic file input/output

Functions

Functions

1. Pointer to a function
2. Inline functions
3. Reference Variables
4. References as function parameteres
5. Using References with a Structure
6. Return a reference
7. Default Arguments:
   ```
   int harpo(int n, int m = 4, int j = 5);
   ```
8. Function Overloading
9. Function Templates
10. Overloaded Templates

Name Spaces and Scope

1. Potential Scope and Scope
2. Namespaces
3. Type cast
4. `sizeof()`
5. escape sequence codes

Objects and Classes

1. Public and private class access
2. Class data members
3. Class methods (also called class function members)
4. Creating and using class objects
5. Class constructors and destructors
6. `const` Member functions
7. `vector` template classes

Objects and Classes

1. Operator overloading
2. Friend functions
3. Automatic conversions and type casts for classes
4. `Vector` class (from book)
5. Using Pointers to Objects
6. Dynamic Memory allocation
7. Copy Constructor

Class Inheritance

1. Base/Parent class
2. Derived/Child Class
3. Polymorphic Public Inheritance
4. Virtual Member Functions