Programming

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Introduction to Programming and Computer Architecture

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Programming

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- · How many people have programmed before?
- · What languages?
- How many people have programmed C or C++?
- Can anyone name any other programming languages?
- WHY C?
- · Some people find programming natural
- Learning a language doesn't necessarily make you a programmer
- · The only way to learn is to do it

A Brief History of C

Late 1960s BCPL designed by Martin Richards, Cambridge

 1970 Based on BCPL, B was designed by Ken Thompson, At&T Bell Labs, for systems programming

1972 Based on B, C was designed by Dennis Ritchie, AT&T Bell Labs, for writing the Unix operating system

• 1970s,80s Unix and C gained wide popularity

• 1989 C standardised: ANSI standard X3.159-1989

• 1990 C adopted as an international standard: ISO 9899:1990

1990s Minor amendments made to the standards

Why programme in C?

Advantages

- C is a real world language, widely available and popular with professional
- C is a small, efficient, powerful and flexible language
- C has been standardised, making it more portable than some other languages
- C is close to the computer hardware revealing the underlying architecture
- C provides enough low level access to be suitable for embedded systems
- C is a high level language allowing complex systems to be constructed with minimum effort

Why programme in C?

- Advantages
 - C's modular approach suits large, multi-programmer projects
 - C's use of libraries makes it adaptable to many different application areas
 - The Unix operating system was written in C and supports C
 - C gave birth to C++, widely used for applications programming and more recently Java which was based upon C++
 - Many other languages borrow from C's syntax: e.q. Java, JavaScript, Perl etc

Why programme in C?

Disadvantages

- C is not really a language for novices; it was designed for professional users
- There are many things that can go wrong if you're not careful
- C lacks much of he automatic checking found in other high level languages
- Small typing errors can cause unwanted effect
- Does not support modern concepts such as object orientation and multi-threading

"C provides enough rope to hang yourself time and time again"

```
if (x>y)
if (x>z)
max=x;
else
max=z;
else
max=y;
else
max=z;
max=max+1;
if (max==100)
max=0;

if (max==0;

if (max==0;

if (max=0;

if (max=0;

if (max=0)

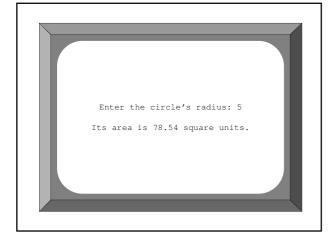
if (max=0;

if (max=0)
```

C program - Intro.c

```
/* Example: C program to find area of a circle */
#include <stdio.h>
#define PI 3.14159

main()
{
   float r, a;
   printf("Enter the circle's radius: ");
   scanf("%f",&r);
   a=PI*r*r;
   printf("Its area is %3.2f square units.\n",a);
   return;
}
```



C program - obscure.c

Course Overview

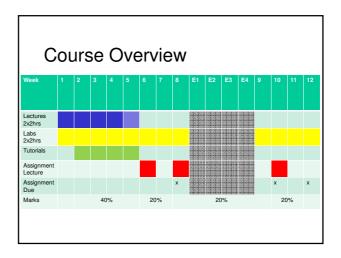
- Aims
 - To lean the basics of computer programming and problem solving
 - To lean the C programming language and how this relates to the physical architecture of the computer

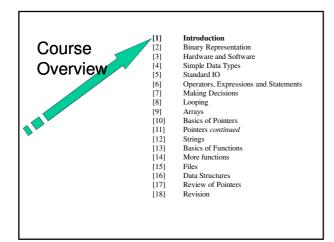
Course Structure

- · Lectures
- Tutorials
- · Laboratories: exercises and assignments

Assessment

- · No exam
- Laboratories
- Assignments x 3
 - 2 weeks each worth 20%





Resources

Books

- Teach yourself C in 21 Days, 4th Edition, by Peter Aitken and Bradley L Jones, SAMS.

 Copies available in the library so you have no excuse.
- Any introductory book on C have a search of the library catalogue.

• Web

- www.surrey.ac.uk/Personal/R.Bowden

Books

- Aitken, P. Jones, B., Sams Teach Yourself C in 21 Days, 0672324482, Sams.
- Gookin, D. C For Dummies, 2nd Edition, 978-0-7645-7068-1, Wiley.
- McGregor, J., McGregor, R., Watt, A., Simple C, 0201403854, Addison Wesley Longman
- Jackson, K., C Programming for Electronic Engineers, 0333637801, Macmillan Press
- Kernighan, B.W & Ritchie, D.M., The C Programming Language, 2nd Ed., 0131103628, Prentice Hall
- Knight, A. J. "Basics of MATLAB and beyond", 1999, 0849320399