SERIES CONCEPT

This series encompasses programming and/or systems analysis. Because the duties of programmers and analysts almost always overlap, the broad scope of this series is intended to reasonably accommodate both types of work. **NOTE:** This series is NOT intended for positions that use computers as tools, e.g., for data analysis, data retrieval, report writing. Such positions should be classified according to their primary functional responsibilities.

Specialties may include, but are not limited to: operating systems; communications; networking; database administration; applications; and administrative, research, or instructional user services and/or consulting. It is recognized that these specialties differ in terms of required technical knowledge and complexity; therefore, positions at the operational level may vary in classification. Programmer / Analysts may be located in central computing or communications organizations, schools, colleges, or individual departments. Since central, school, college, and departmental facilities differ with respect to size and scope of responsibility, it is likely that individual position classifications will differ accordingly. This series differs from the Computer Resource Specialist series in that incumbents focus their efforts on performing programming and analysis and/or providing technical support for others performing programming and analysis; in that they perform these types of tasks on a regular basis and for clients in different functional areas; and in that their expertise is in information systems or communications itself rather than in the way information systems or communications is used in a particular function area.

Programmer / Analysts define and analyze problems for clients in various functional areas. Incumbents effect systems or network-oriented solutions (includes user consultation, where appropriate); prepare general and detailed work plans for implementing solutions; prepare general designs and detailed specifications from which programs will be written or modified; design and/or code new systems or system modifications; test, debug, install, document, and maintain systems, system modifications, or network software; perform database administration functions; analyze, evaluate and implement UC or vendor-provided systems or networks; evaluate hardware; perform audits for the purpose of quality assurance; train and assist users; coordinate within, among or between organizational units (i.e., within a school, among departments, or between central and departmental organization) in the acquisition, use, maintenance, and support of computer or network software and hardware and in the development of applications.

Skills range from those needed at the entry level up to those used to develop, plan, and implement complex systems. Actual positions may use different working titles appropriate to the office, campus or situation, as determined by local management. The Programmer / Analyst series specifically recognizes supervisory responsibility in four of its five levels (II - V).
DEFINITION OF TERMS

The accepted definition of terms describing the size of the computing environment and the complexity of tasks for positions classified as Computing Resource Managers and Programmer / Analysts are as follows:

SMALL COMPUTING OR NETWORKING ORGANIZATION
An organizational unit responsible for operating, maintaining, and supporting one or more multi-user servers with a maximum of 250 connected users or one LAN with a maximum of 250 connected workstations.

MEDIUM COMPUTING OR NETWORKING ORGANIZATION
An organizational unit responsible for operating, maintaining, and supporting at least two multi-user servers with different operating systems and more than 250 connected users, or one LAN with more than 250 connected workstations, or one computer that provides either several major administrative applications or campus wide academic computing and that serves a maximum of 250 concurrent users.

LARGE COMPUTING OR NETWORKING ORGANIZATION
An organizational unit responsible for operating, maintaining, and supporting campus wide communications or one or more computers that provide either multiple major administrative applications or campus wide academic computing and that serve more than 250 concurrent users.

ROUTINE APPLICATIONS PROGRAM
An application program that reads up to two files, performs processing involving arithmetic operations, character search or sorting, and creates output. Routine applications programs generally have limited impact and low visibility. They require general programming or business knowledge.

MODERATELY COMPLEX APPLICATIONS SYSTEM
An integrated set of up to five user written programs that reads from multiple files or Data Base Management System (DBMS) based data base; processes intermediate files using arithmetic functions, character manipulation, and sorting; writes the processed data to one of several output files based on processing results; and produces multiple outputs. Moderately complex applications systems generally have broad departmental impact and significant visibility. They require limited specialized programming or business knowledge.

COMPLEX APPLICATIONS SYSTEM
A highly integrated set of programs with the following: each program may read multiple files or a DBMS based data base; process intermediate files using the full range of software functions available; write the processed data to multiple output Files based on processed data to multiple output Files based on processing results; update the master files, if any, with a capability for full error recovery; and produce multiple output. Complex applications systems generally have wide impact and high visibility. They require a great deal of specialized programming or business knowledge.
ROUTINE SOFTWARE PACKAGES
Vendor supplied and maintained sets of programs which do not require modification of the operating system (systems software) to install nor user configuration.

SOFTWARE PACKAGES OF MODERATE COMPLEXITY
Vendor supplied and maintained sets of programs which do not require modification of the operating system to install, but do require user configuration during the installation process.

COMPLEX SOFTWARE PACKAGES
Vendor supplied and maintained sets of programs which require modification of the operating system (systems software) to install.

OPERATING SYSTEMS SOFTWARE
Software that is fundamental to the operation and maintenance of a computer system, often vendor supplied. It serves as an interface between the hardware and programs written to support applications.

CLASS CONCEPTS

Programmer / Analyst I

Under close supervision, incumbents perform programming and/or assist in design and analysis of systems. This is the entry level for the series for incumbents who have had some education or experience in the fundamentals of programming or analysis.

Examples of duties typically include:
1. Assist with design, analysis, maintenance, documentation, and testing of software.
2. Help prepare detailed specifications from which routine programs will be written.
3. Code, debug, test, and document routine application programs.
4. Install and test routine software packages.
5. Assist in analyzing, evaluating, and implementing UC or vendor-provided systems or networks.
6. Assist in hardware evaluation.
7. Help users with procedural or minor technical problems.
8. Advise or train users regarding the technical aspects and use of standard software packages.
9. Assist in maintaining program libraries, users manuals or technical documentation.
PROGRAMMER / ANALYST – SERIES AND CLASS CONCEPTS

Programmer / Analyst II
Programmer / Analyst II - Supervisor

Under supervision, incumbents perform operational-level programming, systems analysis and/or design functions for routine application systems or for portions of moderately complex or complex systems or network software. A position at this level may supervise lower level computing, networking, or other support staff.

Examples of duties typically include:
1. Analyze and/or design new systems, enhancements to existing systems.
2. Determine source data (input), processing requirements (output), output formats, timing and cost estimates.
3. Verify that system or network meets performance criteria.
5. Design or modify, code, debug, test, and document moderately complex application systems.
6. Prepare detailed specifications from which programs will be written.
7. Install and test moderately complex software packages.
8. Install and maintain operating systems software in a department, school, college, or small computing or networking organization or assist in installing and maintaining operating systems software in a medium or large computing or networking organization, e.g., operating systems, database software, communication/network software, and utility software.
10. Analyze, evaluate, implement UC or vendor-provided systems or networks.
11. Evaluate hardware.
12. Develop and/or teach seminars, workshops, or classes to users or other Programmer / Analysts on the technical aspects or use of computing or networking hardware, software packages or application systems.
13. Consult on the use of moderately complex software packages.
14. Advise users regarding program techniques and design.
15. Maintain program libraries, users manuals, or technical documentation.

Programmer / Analyst III
Programmer / Analyst III - Supervisor

Under general supervision, incumbents perform programming, systems analysis, and/or design for moderately complex or complex application systems. Assignments typically require either advanced knowledge of hardware, software, or systems analysis techniques and standards, or specialized knowledge of a subject matter, discipline, or administrative function. Positions in this class may have project leadership or supervisory responsibility over several Programmer / Analysts and be responsible for more than one portion of a system or network software or they may be responsible for a portion of a complex system or network with no supervisory responsibilities. Incumbents work on multiple tasks that are not necessarily well defined; make recommendations that may have an impact on an entire project or system or on the operation of a medium or large computing or networking organization. Incumbents may provide advanced technical guidance to others at the same or lower level on a continuing basis.
In addition to performing work described at Level II, examples of duties typically include:

1. Work with users in designing moderately complex application systems or portions of complex application systems.
2. Prepare cost/benefit analysis of alternative solutions.
3. Specify alternate program design approaches.
4. Install or maintain complex application systems or complex software packages, which require knowledge of interfaces and of impact on users.
5. Install and maintain operating systems software in a medium or large computing or networking organization, e.g., operating systems, database software, communication/network software, and utility software.
6. Perform database administration functions.
7. Provide consulting service in specialized programming languages and software.

**Programmer/Analyst IV**

**Programmer/Analyst IV – Supervisor**

Under direction, incumbents work as functional leaders or as technical experts.

**FUNCTIONAL LEADER**

As functional leaders, incumbents provide leadership for planning, development, implementation, maintenance, and documentation of large systems, network software, or networks supporting multiple functions and crossing organizational lines:

- Supervise Programmer / Analysts and other staff working on multiple projects affecting several departments;
- Select and train staff in systems analysis and design techniques, machine approach, programming, time estimation, and scheduling;
- Provide technical review and direction;
- Plan and develop processing systems by conferring with high-level management to determine problems and feasibility of departmental requests;
- Analyze proposed new systems, network software, networks, or changes to existing systems, network software, or networks in terms of cost, benefit, timeliness, and effectiveness.

**TECHNICAL EXPERT**

As technical experts, incumbents function as top-level technical contributors in a computing specialty. They exhibit full technical mastery of system internals and operating systems software and hardware interrelationships. This is the advanced operational level for complex software support typically in a large computing or networking organization.

- Design programs, prepare detailed specifications from which programs will be written, evaluate programs, or provide advanced technical direction for databases, systems, or networks with multiple tasks or interfaces, including responsibility for system integrity, recoverability, and controls.
- In a large computing or networking organization with campus wide impact, install, maintain, administer, monitor, or consult on operating systems software with responsibility for performance and reliability. This includes operating systems, databases, communications/networks, teleprocessing monitors, or similar software.
Programmer / Analyst V
Programmer/ Analyst V - Supervisor

Under general direction, incumbents work as functional leaders or as technical experts.

FUNCTIONAL LEADER
As functional leaders, incumbents perform Level IV functional leader duties, supervise two or more Level IV Programmer / Analysts and/or other staff, and perform one of the following:

- Manage small, highly technical software groups, e.g., network programming, systems software, or database systems in a large computing or networking organization.

OR

- Manage multiple projects or teams having campus wide impact or involvement; formulate policy; determine priorities and resource requirements, typically in a large computing or networking organization.

TECHNICAL EXPERT
As technical experts, incumbents:

- Design, develop, or prepare detailed specifications for state-of-the-art operating systems software in a large computing or networking organization, usually with systems software or control programs provided by multiple vendors. The technical systems contributions are original, innovative, and significant. Typically, design is for teleprocessing monitors, database software, compilers, networks, multiple-user interactive systems, operating system, or similarly complex products.

MINIMUM QUALIFICATIONS

Incumbents are expected to possess the skills, knowledge, and abilities essential to the successful performance of the duties assigned to the positions.

Positions allocated to the supervisory titles must also meet the criteria for supervision as defined in the Guidelines for Requesting Supervisory Designation for Positions.